The RUBBER AGE

August, 1943

CAPTAX-ALTAX

These are still good general purpose accelerators, as found in the past, regardless of the Rubber Hydrocarbon now being vulcanized.

Now that GR-S is actually in extensive commercial usage and the results of service performance are becoming known, it is being realized that overcures with consequent low elongations are increasingly dangerous.

CAPTAX and ALTAX alone do not over-cure GR-S; they may with good results be slightly activated when desired for very short cures.

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York City

Newsletter No. 8
AUGUST, 1943
Published by Rubber Chemicals Division of DUPONT

SRA NO. 1
A General Purpose Accelerator for GR-S

A general purpose accelerator may be defined as one which produces safe processing stocks having a suitable rate of cure and resulting in vulcanizates having the desired properties for any type of product. Such an accelerator has never been developed. However, SRA No. 1 fulfills the following requirements of a general purpose accelerator for GR-S:—

1. Safe processing
2. Fast curing
3. Economical
4. Easy to use—is self activated, requires no secondary accelerator.
5. Produces vulcanizates having excellent physical properties and resistance to aging.

The physical properties of SRA No. 1 are listed below:—

Chemical Composition	—A physical mixture of MBT and DPG
Appearance	—A light cream colored powder
Specific Gravity	—1.28
Melting Point	—166°C. (approximate)
Storage Stability	—Good
Health Hazards	—None when used in GR-S in the amounts recommended.
Activation	—No secondary accelerator required
Zinc Oxide	—Use of 3 to 5 parts recommended
Stearic Acid	—Use of 1 to 2 parts recommended
Amount to Use	—One part of SRA No. 1 with 2.5 to 3 parts of sulfur, or 1.3 part SRA No. 1 with 2 parts of sulfur.
Curing Range	—250°F. and above. Normal cures in 30 minutes at 287°F.

SRA NO. 1 is a good general purpose accelerator for GR-S and will undoubtedly be found to have special characteristics to meet the requirements of certain specialized applications. It is expected that other accelerators and accelerator combinations such as Thionex, 2-MT-Accelerator 808, and activated MBT and MBTS, will continue to find favor for certain uses. But the properties imparted by SRA No. 1 demand its investigation wherever the combination of economy and quality is of interest. An example of the properties imparted by SRA No. 1 is shown in the accompanying table.

TEST COMPOUND	
GR-S	100.0
Channel Carbon Black	50.0
Zinc Oxide	5.0
Sulfur	2.0
Stearic Acid	1.0
SRA No. 1	1.3
PHYSICAL TEST DATA	
Optimum Cure at 274°F — Minutes —	60
Stress at 300% Elongation — psi —	1750
Tensile Strength at Break — psi —	3450
Elongation at Break — % —	465
Hardness — Durometer, Shore A	63
Tear Strength—lbs. per inch at 30°C.	235
at 70°C.	255
Heat Build-Up—Goodrich Flexometer—⅛-inch Stroke — 20 Minutes — °C.	52

SRA No. 1 is that particular mixture of MBT and DPG which has been found to be exceptionally effective and economical. It is blended to provide an easy method of handling, and you will want to try it in both the laboratory and the factory.

DUPONT
RUBBER CHEMICALS DIVISION
BETTER THINGS FOR BETTER LIVING . . . Through Chemistry

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. August, 1943. Vol. 53, No. 5.

This is poison to Hitler

THE young woman technician shown here is carefully weighing out an important ingredient for a test compound of Hycar . . . one of hundreds of such batches going through our Customer Service Laboratory every few days.

It is through such painstaking research that today's excellent stocks for fuel cells, hose, seals, diaphragms and scores of other vital products have been perfected. It means synthetic rubber products that not only the Air Force, but the Army, Navy, Merchant Marine and critically important industries are depending upon for the most strenuous kind of service . . . products that are poison to the Axis.

Complete, modern, fully staffed, and with a wealth of successful experience as its background, the Hycar Customer Service Laboratory is both ready and able to serve you well. *Hycar Chemical Company, Akron, Ohio.*

Hycar

LARGEST INDEPENDENT PRODUCER OF BUTADIENE SYNTHETIC RUBBER IN AMERICA

THE SIGN OF THE MOST COMPLETE LINE OF ZINC OXIDES

• The Sign of the most complete range of zinc oxide particle size characteristics — ranging from the colloidal dimensions of Kadox to the relatively coarse Horse Head XX Red-78.

• The Sign of the manufacturer of both "fast" curing and "slow" curing zinc oxides.

• The Sign of zinc oxides made under three different processes—American Process, French Process, Palmerton Process — in order to impart special properties to meet a variety of special rubber requirements.

• The Sign of the manufacturer of special zinc oxides for improved processing.

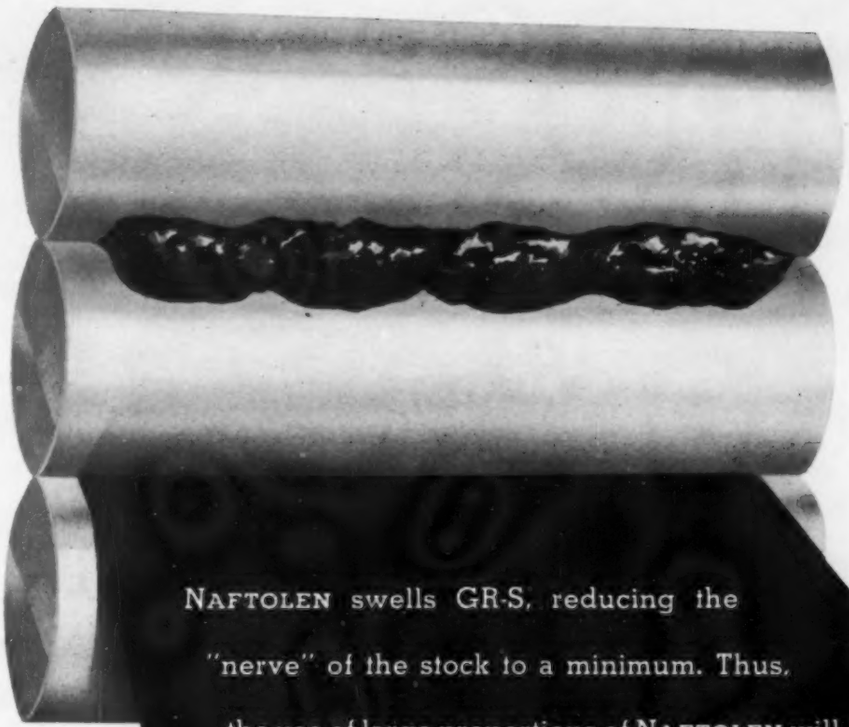
• The Sign of the largest and best equipped research organization devoted to the study of zinc products.

THE NEW JERSEY ZINC COMPANY

Manufacturers of the Famous Horse Head Zinc Products

NAFTOLEN . . . *the solution to your*

GR-S Calendering Problems



NAFTOLEN swells GR-S, reducing the "nerve" of the stock to a minimum. Thus, the use of large proportions of NAFTOLEN will result in a soft, tacky stock that can be calendered without difficulty. For this purpose we recommend 50 parts or more of NAFTOLEN for every 100 parts of GR-S. NAFTOLEN is an unsaturated hydrocarbon, and therefore proper sulfur adjustment is necessary for optimum results.

WILMINGTON CHEMICAL CORPORATION

10 East 40th Street, New York 16, N. Y.

Plant and Laboratory: Wilmington, Delaware

ARE YOU FAMILIAR WITH THE *advantages* OF LINERETTE?

LINERETTE is ideally suited for use with lightweight, frictioned stocks. It is not offered as a substitute for Holland cloth; yet we have reason to believe Linerette has been used successfully for a period of years where Hollands were formerly used, including various gum stock operations.

Linerette preserves the tackiness of the stock because it contains no oil or wax that migrate into the stock. Introduced in 1925, Linerette is thoroughly tried and proven. It is a specification sheet, made to rigid standards of quality.

These important advantages, plus the fact that it is plentiful and low in price, account for the steadily increasing popularity of Linerette. You should investigate Linerette *now*. Write for samples, specifying width desired.

THE CLEVELAND LINER & MFG. CO.

CLEVELAND, OHIO

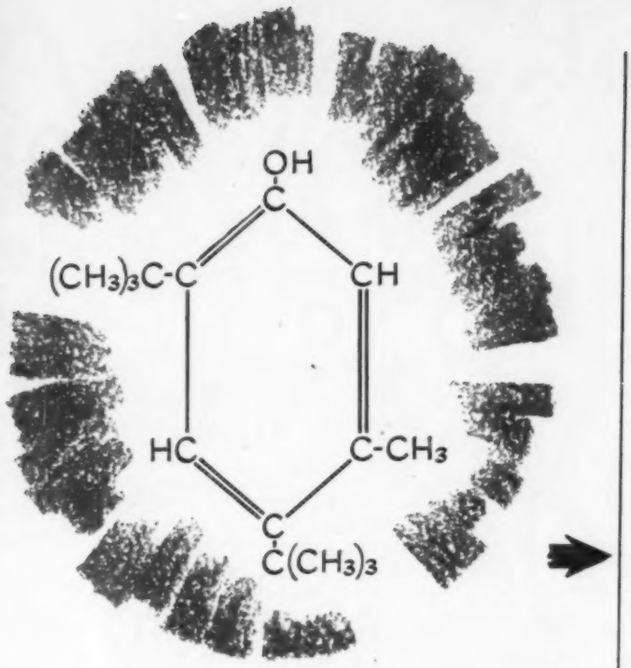
CLIMCO
THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO, U.S.A.

LINERETTE
is made by the
manufacturers of
CLIMCO
PROCESSED LINERS

LINERETTE

INTERLEAVING PAPER

KOPPERS D. B. M.



4, 6-Di-tertiary-BUTYL-m-CRESOL

Properties: *(Pure Compound)*

Molecular Weight	220
Melting Point	62.5°C.
Boiling Point:	
At 100 mm. (approximate)	171°C.
Atmospheric (approximate)	285°C.
Specific Gravity at 50/50°F	0.920

State: Light-colored semi-solid, crystalline, mild odor.

Solubility: Practically insoluble in water. Easily soluble in alcohol, benzene, gasoline and carbon tetrachloride. Insoluble in caustic alkali solutions.

Uses: In compounding certain types of synthetic rubber, as a softener and plasticizing agent, and to improve tack. In the manufacture of resins, particularly because of its oil-solubility. It has been suggested for use as an anti-skinning agent for paints and varnishes.

Koppers will be glad to submit samples and prices on this and other coal derivatives, including tar bases, naphthalene, industrial pitches and creosote.

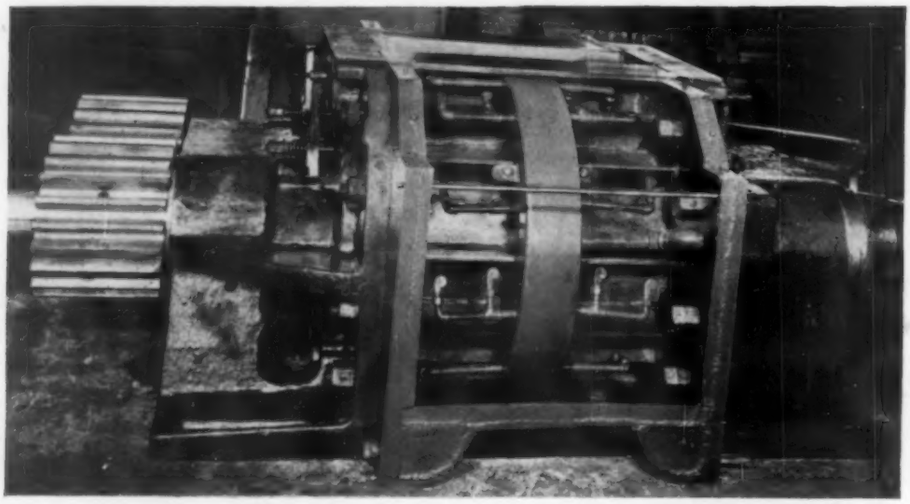
Koppers also supplies to the chemical industry: Coal for steam and for processing. Coke for metallurgical use and for heating. Coal processing systems. Gas plants. Gas purification systems. Gas holders. Valves. Time cycle controls. Anti-corrosive alloys. Fast's self-aligning couplings. Piston rings for compressors, pumps, and steam and diesel engines. Pressure-treated timber for damp and humid locations. Coal tar roofing, waterproofing, dampproofing, industrial pitches.—Koppers Company and Affiliates, Pittsburgh, Pa.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

we've got what it takes—

To Redesign and Rebuild Banburys for Synthetic Compounding—



A Case in Point—

Here is an illustration bearing evidence of the specialized skill we are providing many in the Industry—a skill that is making an important contribution to the Synthetic Program through the improvement of speed and efficiency in the mixing of Synthetic compounds . . . Your equipment can be brought up to the high-efficiency level to conserve materials and investment . . . Ask us—*we know how.*

SERVING THE RUBBER INDUSTRY

INTERSTATE WELDING SERVICE

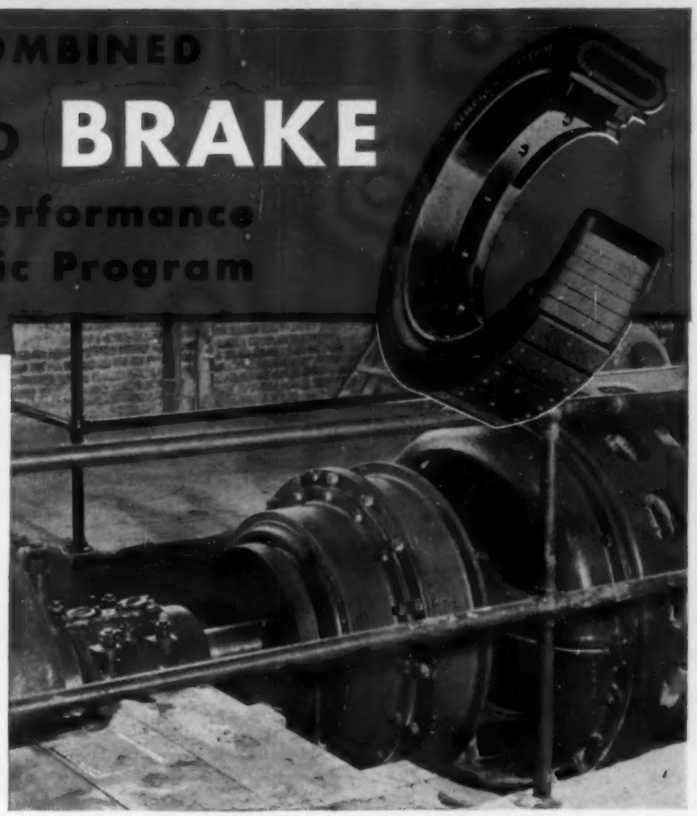
Main Plant: 914 Miami Street . . . AKRON, OHIO . . . Phone: JE 7970

EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

THIS NEW COMBINED

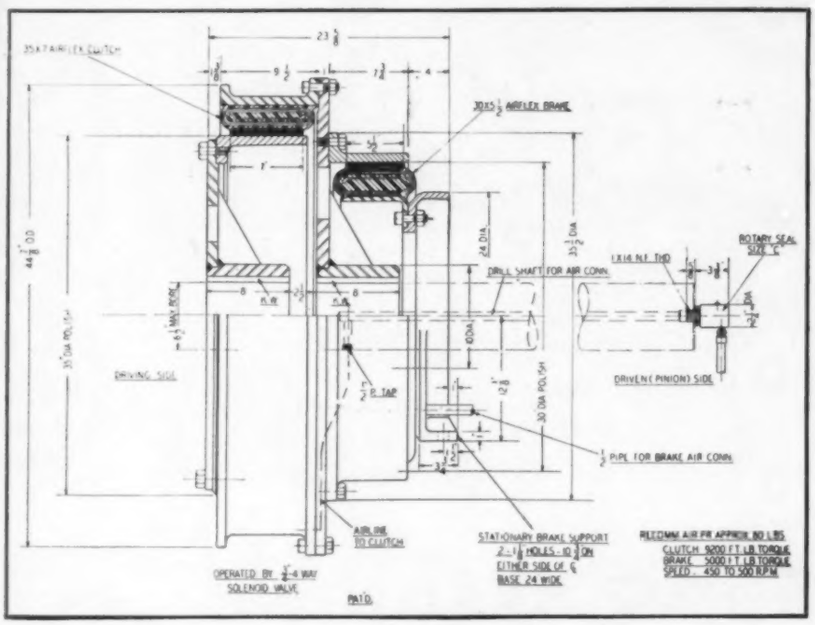
CLUTCH AND BRAKE

means better performance in your Synthetic Program



The Fawick Airflex Clutch operates by rigidly-controlled inflation and deflation of a tire-like rubber gland. The "grip" of the clutch is light or firm at will—for any inertia or torsional characteristics that may be present. Vibration is absorbed, protecting both drive and driven members. There are no arms, toggles or levers—no costly or critical electrical equipment—no adjustments or lubrication needed—maintenance costs very low. Smooth starts, and quick stops in emergencies.

Illustrated is one of several combined Airflex Clutch and Brake installations, as shown in drawing, on 500 hp rubber mill drive for Rome Cable Company, Rome, N. Y. *Installation costs less than half of former equipment.*



12 ADVANTAGES

1. Simple in design and operation
2. Flexible control by air
3. No adjustments or oiling—low maintenance
4. Dampens vibration—absorbs shocks
5. Corrects misalignment automatically
6. Smooth starting—no jerks
7. Quick stopping
8. Runs cooler—uniform pressure
9. Controls torque by air pressure
10. Greater capacity—more compact
11. Replaces couplings
12. Remote control by 4-way air valve

Address Your Inquiries to FAWICK AIRFLEX COMPANY, INC., 9919 Clinton Rd., Cleveland 11, O.

FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

Capitol Process Liner Treatment

versus

Untreated Liners

If you are using untreated liners because it has been believed that processing would make them too expensive, we emphasize that Capitol Process Liner Treatment is reasonable in cost.

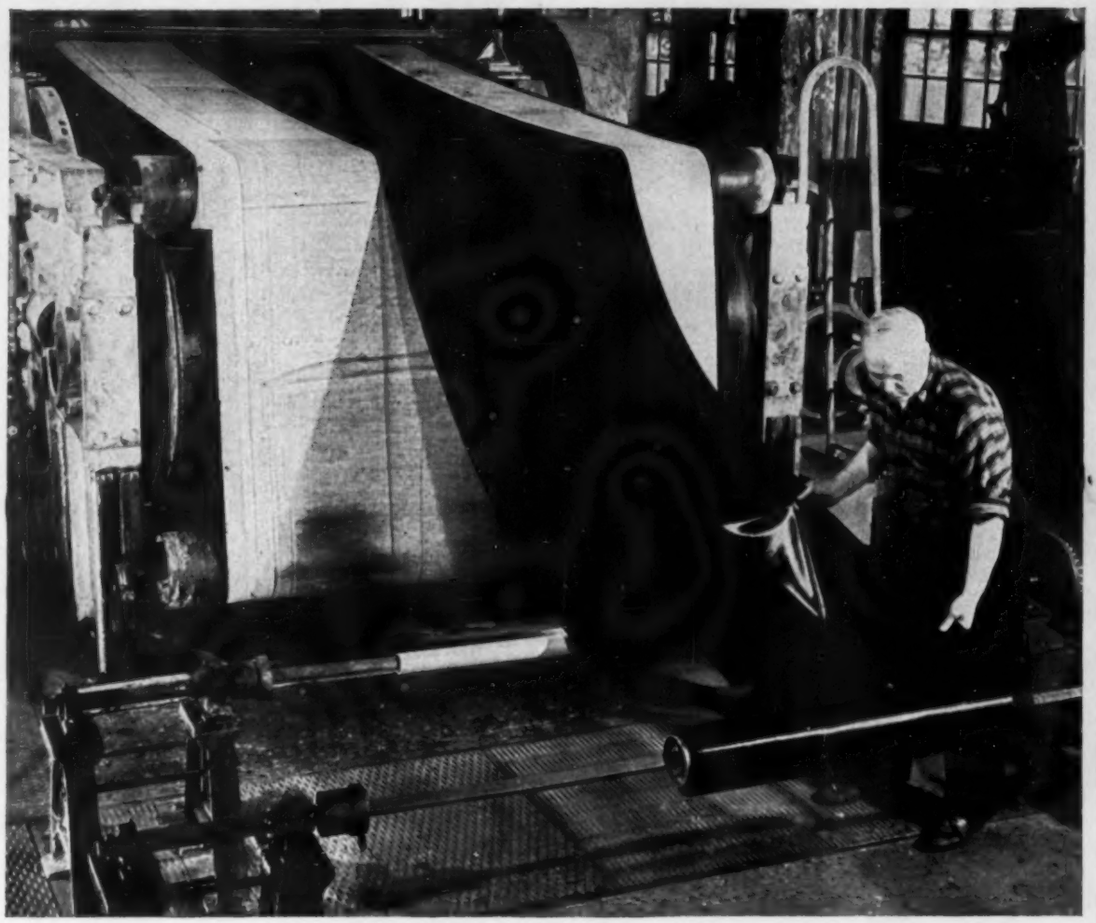
Further, our treatment will make it possible to use your liners for a considerably longer time, thus actually reducing purchases of new cotton piece goods. Over a period of time Capitol Liner Treatment will, literally, "pay for itself."

Take advantage of our offer to process a sample liner gratis. Send 50 or 100 yards and we will treat it and return for testing in your plant. No obligation will be incurred.

TEXTILE PROOFERS, INC.

181-193 Culver Ave., Jersey City, N. J.

Originators of the Capitol Process Liner Treatment



Synthetic Rubber "Wallpaper"

FOR UNCLE SAM'S UNDERGROUND OIL TREASURIES

"YOU can't store light oils and gasoline in concrete tanks," said precedent. "Oh, yes, you can," said the Navy. *And they did.*

Today, whole tank farms are now in use — underground and camouflaged. Now tremendous vaults holding as much as 100,000 gallons are storing precious fuels...all through the development of an oilproof "wallpaper" made of Thiokol* synthetic rubber.

You see, concrete is highly alkaline. In contact with aviation gasoline, these alkalies cut the fuel's all-important octane rating. Too, concrete is porous — allows precious fuel to escape.

Working closely with the Navy, the Boston Woven Hose and Rubber Company perfected a thin sheet of Thiokol synthetic rubber. This is welded to the walls and floors of the tanks with a special synthetic rubber cement. Every square inch is covered. The fuel never touches concrete. The octane rating stays up and the fuel stays in.

Valuable information on hundreds of interesting applications of Thiokol synthetic rubber is available to any American manufacturer doing war work. Ask us for it.

Thiokol Corporation, Trenton, N. J.

*Thiokol Corporation, Trademark Reg. U. S. Pat. Off.

Thiokol*

SYNTHETIC RUBBER

"America's First"

TIME IS ONE THING *You Can't Replace!*

...SKELLYSOLVE SERVICE *Prevents Its Loss!*

● When time makes a difference—it makes a *whale of a difference.*

That is exactly why so many users of solvents depend on *Skellysolve*—and on *Skellysolve Service.* When an emergency arises—Skellysolve Service meets it. When you must have the right type of solvent and must have it f-a-s-t—Skellysolve Service *gets it there.* When you have a problem that requires specialized technical knowledge—Skellysolve Service tackles it with sleeves rolled up.

You, too, can depend on Skelly. Phone, write, or wire for information or assistance. Address SKELLYSOLVE DIVISION at address below.

SKELLY

SKELLYSOLVE
in the
RUBBER INDUSTRY

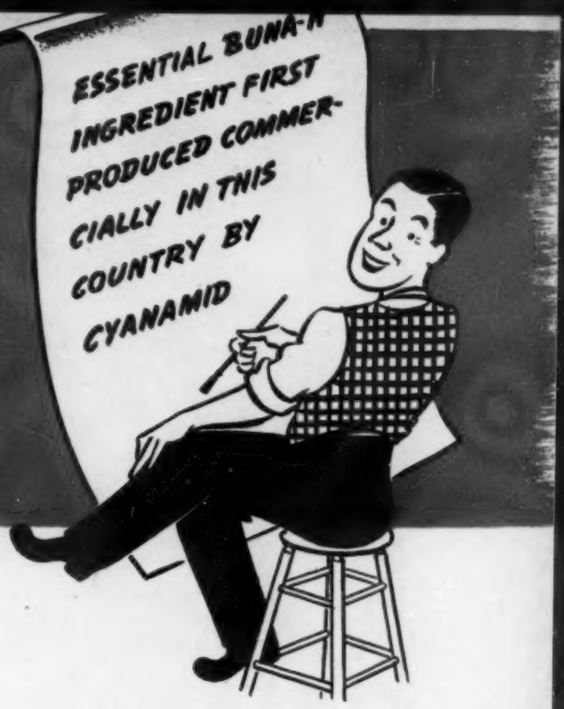
There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

ACRYLONITRILE

OUTSTANDING INTERMEDIATE FOR STRATEGIC OIL-RESISTANT RUBBER SYNTHESIS



Before the war cut off most of our sources of natural rubber supply and created the tremendous demand that exists for all types of synthetic replacements, acrylonitrile had taken its place as the "key" material for the manufacture of oil-resistant synthetic rubber with properties superior in many ways to the natural product.

At Cyanamid, the development of a new chemical process made it possible to initiate the first commercial production of acrylonitrile in this country. Today, the record of how far these timely developments have gone to make the United States independent of natural rubber speaks for itself. Because of its properties that provide exceptional resistance to grease, gasoline, light, heat and abrasion, acrylonitrile has been able to bridge one of the most critical gaps in natural rubber supplies. For example, the acrylonitrile in synthetic compounds of the Buna-N type provides long-lasting qualities in products such as tubing, hose lines, footwear, belting, gaskets, other automotives and aeronautical parts where oil attack previously had proven common and costly. In addition, acrylonitrile type of rubber is reliably uniform and maintains its excellent characteristics indefinitely.

Since the company's pioneering undertaking in the production of acrylonitrile, Cyanamid's capacities have been constantly expanded to keep pace with the growing demand until today Cyanamid is the largest producer of acrylonitrile.

In addition to Cyanamid's outstanding position as a supplier of acrylonitrile, our production of rubber accelerators, phthalic esters, alum and acids has enabled Cyanamid to play a major part in the nation's rubber program so vital to victory.

Cyanamid's warehouses are situated at conveniently located shipping points to the centers of rubber production. This saves valuable time so essential in maintaining production schedules. Cyanamid's laboratory technicians are likewise prepared to assist you in any problems that you may encounter both in selection of materials and processing.

An important wartime use for acrylonitrile type rubber is in production of bullet-sealing fuel tanks.

Acrylonitrile type rubber, widely used before the war, offers an important medium for future new product duvelopments.

CYANAMID'S CHEMICALS FOR RUBBER PRODUCTION:

Aero* Brand Acrylonitrile • Aero Brand DPG • Aero Brand DOTG

AeroAC50** • Dibutyl Phthalate

Aero Brand Rubber Sulphur

K&M Magnesium Oxide • Alum

K & M Magnesium Carbonate

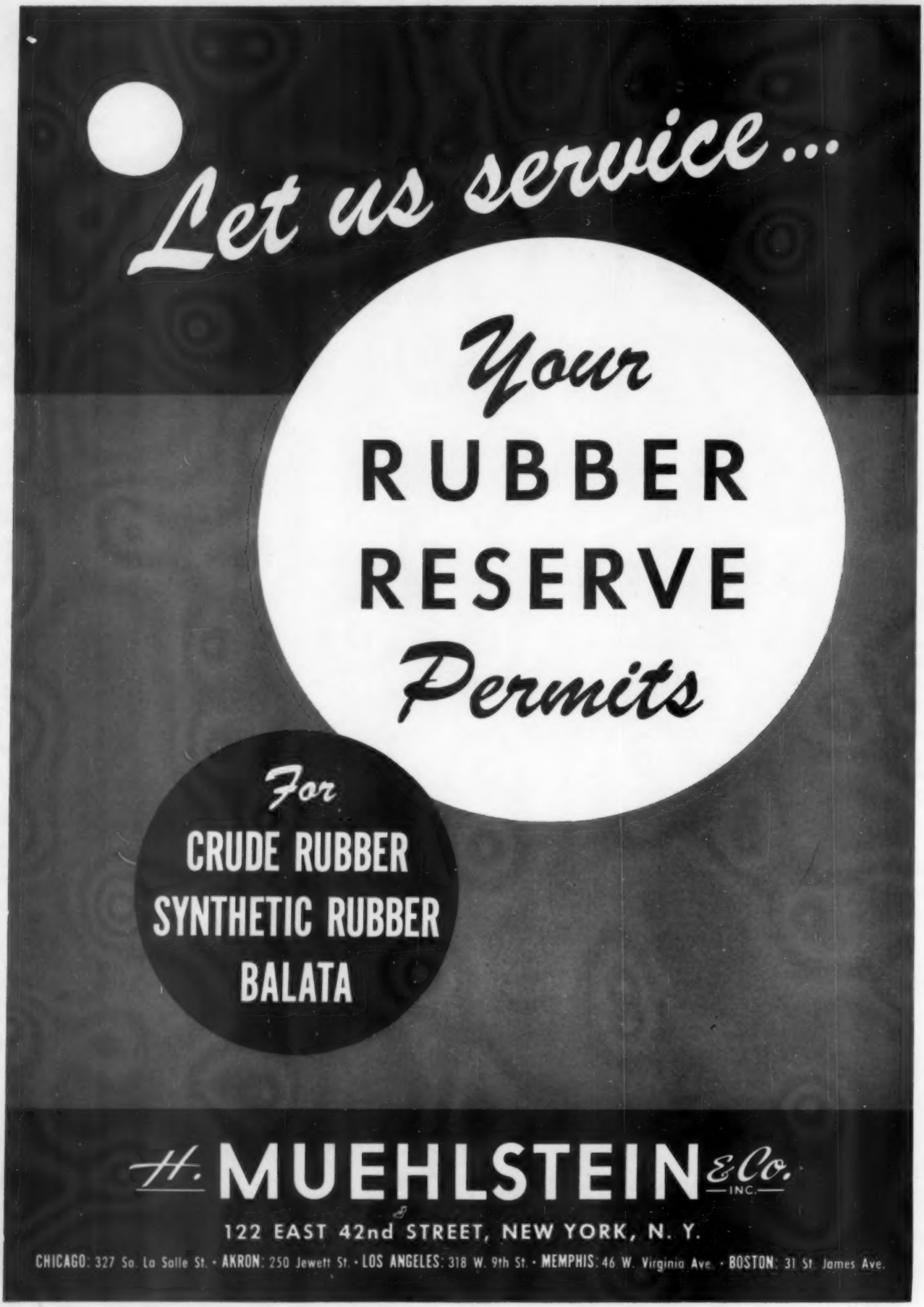
*Reg. U. S. Pat. Off.
**Trade-mark

American Cyanamid & Chemical Corporation

(A Unit of American Cyanamid Company)

30 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

Sales Representatives to the Rubber Industry and stock points: Ernest Jacoby & Company, BOSTON, MASS.
H. M. Royal, Inc., TRENTON, N. J. and LOS ANGELES, CAL. • Herron & Meyer, CHICAGO, ILLINOIS
Akron Chemical Company, AKRON, OHIO


Let us service...
Your
RUBBER
RESERVE
Permits
For
CRUDE RUBBER
SYNTHETIC RUBBER
BALATA
H. MUEHLSTEIN & Co. INC.
122 EAST 42nd STREET, NEW YORK, N. Y.
CHICAGO: 327 So. La Salle St. · AKRON: 250 Jewett St. · LOS ANGELES: 318 W. 9th St. · MEMPHIS: 46 W. Virginia Ave. · BOSTON: 31 St. James Ave.

SYN-TAC IMPROVES TACK

SYN-TAC IMPROVES DISPERSION

SYN-TAC IMPROVES TEAR

SYN-TAC IMPROVES ELONGATION

The C. P. Hall Co. CHEMICAL MANUFACTURERS

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

A SOUND SOURCE OF

PLASTICIZERS

FOR SYNTHETIC RUBBERS

offering

A WIDE RANGE OF PROPERTIES AND PRICES

If your problem is the securing of adequate supplies of suitable plasticizers for rendering synthetic rubbers resistant to oil, aromatic and aliphatic solvents, get in touch with RCI. From this single source you can obtain dibutyl phthalate, dibutyl sebacate and RC-103 Plasticizer—a combination providing a wide variation in production costs and a wide choice of properties including Low Williams plasticity, high resilience, low temperature flexibility, low durometer and low compression set. In short, the requirements are few, indeed, that one of this trio cannot meet.

EXTENSIVE FACILITIES AND BROAD EXPERIENCE

RCI's extensive manufacturing facilities and large scale production assure prompt action on orders for any quantity of these plasticizers—while RCI's broad experience as a manufacturer of industrial chemicals assures the standardized quality you must have to maintain your own production and reputation.

ACTIVE RESEARCH AID

The RCI laboratories and the help of a research personnel from which have already come many contributions to the synthetic rubber industry are at the service of all RCI customers. Get all the facts—write direct to the Sales Department for detailed information on RCI plasticizers and RCI service.

REICHHOLD CHEMICALS, INC.

Other plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Sydney, Australia

CHEMURGIC RUBBER • CHEMICAL COLORS • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS • SYNTHETIC RESINS

"Saved! For War Weapons . . . 125,000 Pounds of Rubber"

SUN RUBBER PROCESSING OIL

Conserves 10% of Rubber . . . Speeds Production

125,000 pounds of natural rubber released to the government yearly for gas masks, tanks, airplanes, and other vital war needs! That is the report of just one nationally-known manufacturer of important rubber products since changing to Sun Circo Light Process Oil as a plasticizer.

At the suggestion of a Sun "Doctor of Industry," numerous tests were made at this plant, using Circo Light Processing Oil instead of their former combination of cottonseed oil and spindle oil. An effective compound resulted, which, through better assimilation, uses 10% less rubber, eliminates waste, increases production, and saves thousands of dollars a year while retaining all desirable physical characteristics. Another victory for Circo Light!

Talk to a Sun "Doctor of Industry" yourself. He may suggest a change in formula—whether for pure, reclaimed, or synthetic rubber—which will conserve your current rubber supply, step up production, and cut costs in your plant.

SUN OIL COMPANY • *Philadelphia*

Sun Oil Company, Limited, Toronto, Canada

SUNOCO

SUN INDUSTRIAL PRODUCTS *HELPING INDUSTRY HELP AMERICA*

BUCA

A New Pigment for Compounding All Types of Synthetic Rubber!

GR-S	100.
Sulfur	2.5
Cumar MH 2½	5.
Zinc Oxide	5.
Stearic Acid	1.
Captax	2.
BUCA	100.

Cure 40 lb. Steam (287° F)

	TENSILE	ELONGATION	MOD. @ 300%
15 Minutes	1208	825%	370
30 "	1649	725	419
45 "	1858	687	472
60 "	1836	675	474
75 "	1813	675	493

MIXED AS FOLLOWS: Masterbatch was made up with some GR-S, Sulfur and Cumar MH 2½ mixing at 200° F. Allow this to rest for 24 hours and mixed with the rest of the GR-S. Pigments and accelerator were added in the usual manner.

MOORE & MUNGER

33 RECTOR STREET

NEW YORK

ALL OUT TO WIN THE WAR

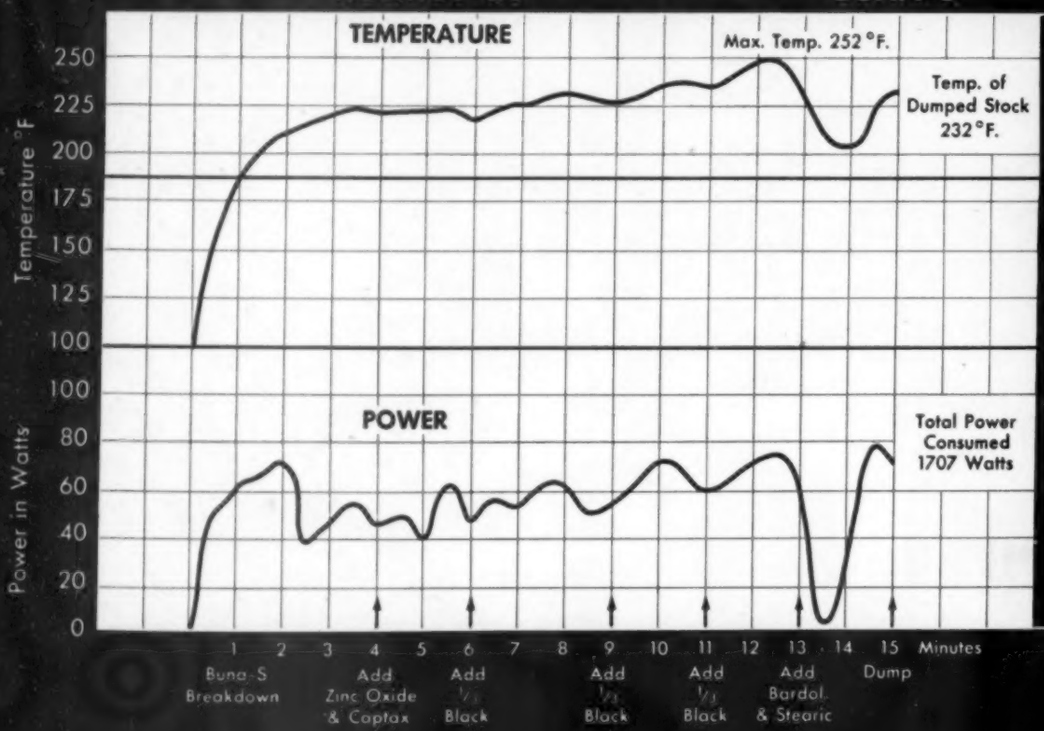
UNITED BLACKS KEEP GREMLINS
FROM YOUR RUBBER COMPOUNDS

KOSMOBILE 77 · DIXIEDENSED 77
DIXIEDENSED · KOSMOBILE
KOSMOS 20 · DIXIE 20

UNITED CARBON COMPANY, INC.
Charleston, West Virginia
New York · Akron · Chicago

TEMPERATURE RISE & POWER CONSUMPTION IN BANBURY "B"

KOSMOS-20 BUNA-S



RECIPE	
Buna-S	100
Sulphur	2
Zinc Oxide	5
Kosmos 20	50
Captax	1.5
Bardol	5.
Stearic Acid	1.5

BANBURY CONDITIONS	
Batch Size, Grams	1200
Cooling Water	100 °F
Speed, R.P.M.	
Front Rotor	115
Back Rotor	102

Research Division
United Carbon Co. Inc.
Charleston, W. Va.

Chart # 1

This is the first of a series of charts depicting the temperature rise and power consumption of UNITED BLACKS in Buna S when mixed in a Banbury.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON, W. VA.

How to improve GR-S flexibility at low temperatures

Bardol,* when used with GR-S (Buna S), acts as a wetting agent and is an effective plasticizer, promoting dispersion of sulphur and accelerators in the elastomer. Manufacturers have found that incorporation of this coal-tar chemical improves flexing properties and provides greater resistance to ply separation when applications involve exposure to low temperatures.

Tests have also shown that Bardol is compatible with GR-S and processes readily. It may be used to advantage to improve these properties:

- **Resilience and low hysteresis**
- **Tensile strength and elongation**
- **Low permanent and compression set**
- **Resistance to abrasion**

For complete details, wire or write

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

ONE OF AMERICA'S GREAT BASIC BUSINESSES

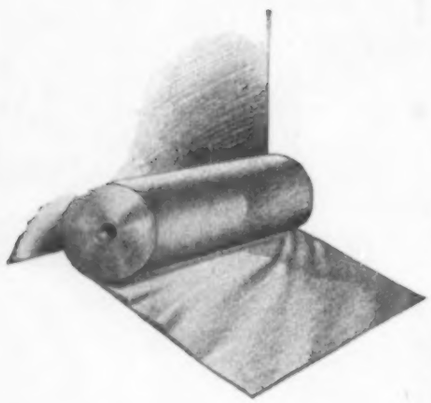
Barrett

*Reg. U. S. Pat. Off.

CLOTH IS THE MEANS TO MANY ENDS

We take cloth in many weights and textures and then upon or within that cloth we prepare it for a great many different uses — too many to enumerate, too varied in properties to fully describe — too rapidly extending into new fields of use to classify.

Cloth is a foundation structure extremely flexible and very strong. It may be impregnated with a water resistant synthetic retaining its texture appearance, or it may be surface-coated concealing the texture.



Treatments render it waterproof, mildew-proof, fire and weather resistant. Transparent as in the case of tracing cloth, opaque as for window shades, etc. Treated cloth has a great industrial field of usefulness — only partly explored.

Our business is preparing cloth for special needs — print cloth, sheeting, drill, twill, duck — dyed, coated, impregnated, stiffened, etc. *Consider cloth for your post war needs — consult Holliston.*

PRODUCTS

BOOKBINDING FABRICS
(a) Waterproof, full coated or impregnated, linens and vellums: Pyroxylin and other synthetic resin and lacquer treatments.
(b) Starch filled, coated, impregnated. Natural, rough or smooth finishes, embossings, printings.

SHADE CLOTH
(a) Pyroxylin or resin impregnated waterproof, meeting Government specifications.
(b) Starch filled, water color, machine oil, oil tints, and Holland type shades; oil filled opaques; fast dyed duck shades; light-proof and translucent.

PHOTO CLOTH
Photo Mounting cloth (self adhesive).

REINFORCING FABRICS
All types of waterproof and filled reinforcing fabrics and industrial cambrics. Various weights from the thinnest print cloth to the heaviest drills and twills.

SIGN, LABEL AND TAG CLOTHS
Waterproof and starch filled. We can design a surface that will take any ink or meet any inking problem.

RUBBER SEPARATOR CLOTHS
Starch filled glazed sheetings and base treated starched fabrics for waterproof separator cloths.

INSULATING CLOTH BASE
Base treated and stiffened fabrics for insulating cloths.

TRACING & BLUE PRINT CLOTHS
White and blue ink or pencil cloth; map cloth; blue print cloth, thin and regular.

LINING FABRICS
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COATED AND IMPREGNATED FABRICS
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Shortage of manpower — both in our offices and at our printer — has delayed us at every stage of production. Some suppliers and rubber manufacturers also have been slower than usual in returning their questionnaires due to other demands on their time.

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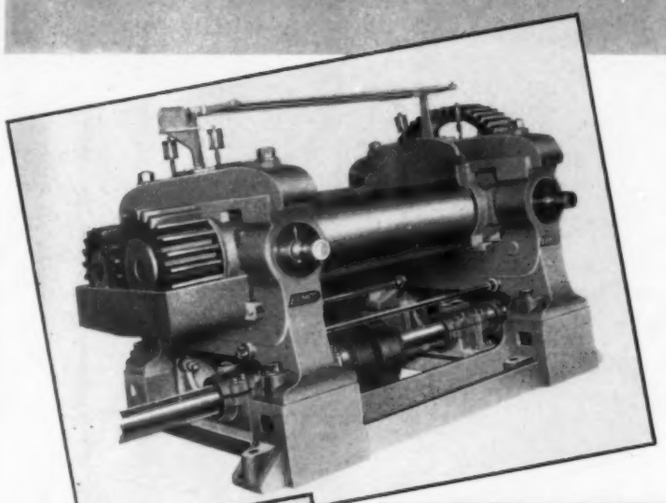

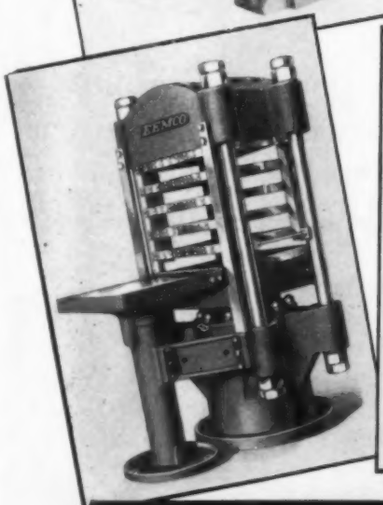

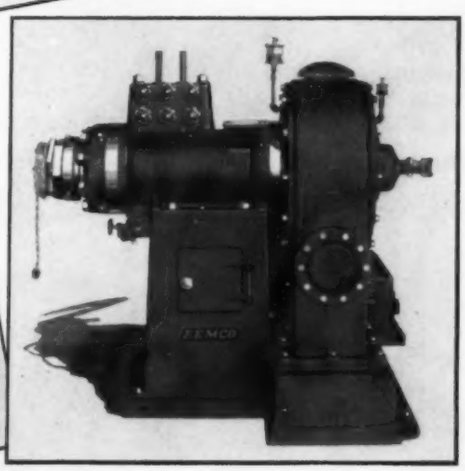

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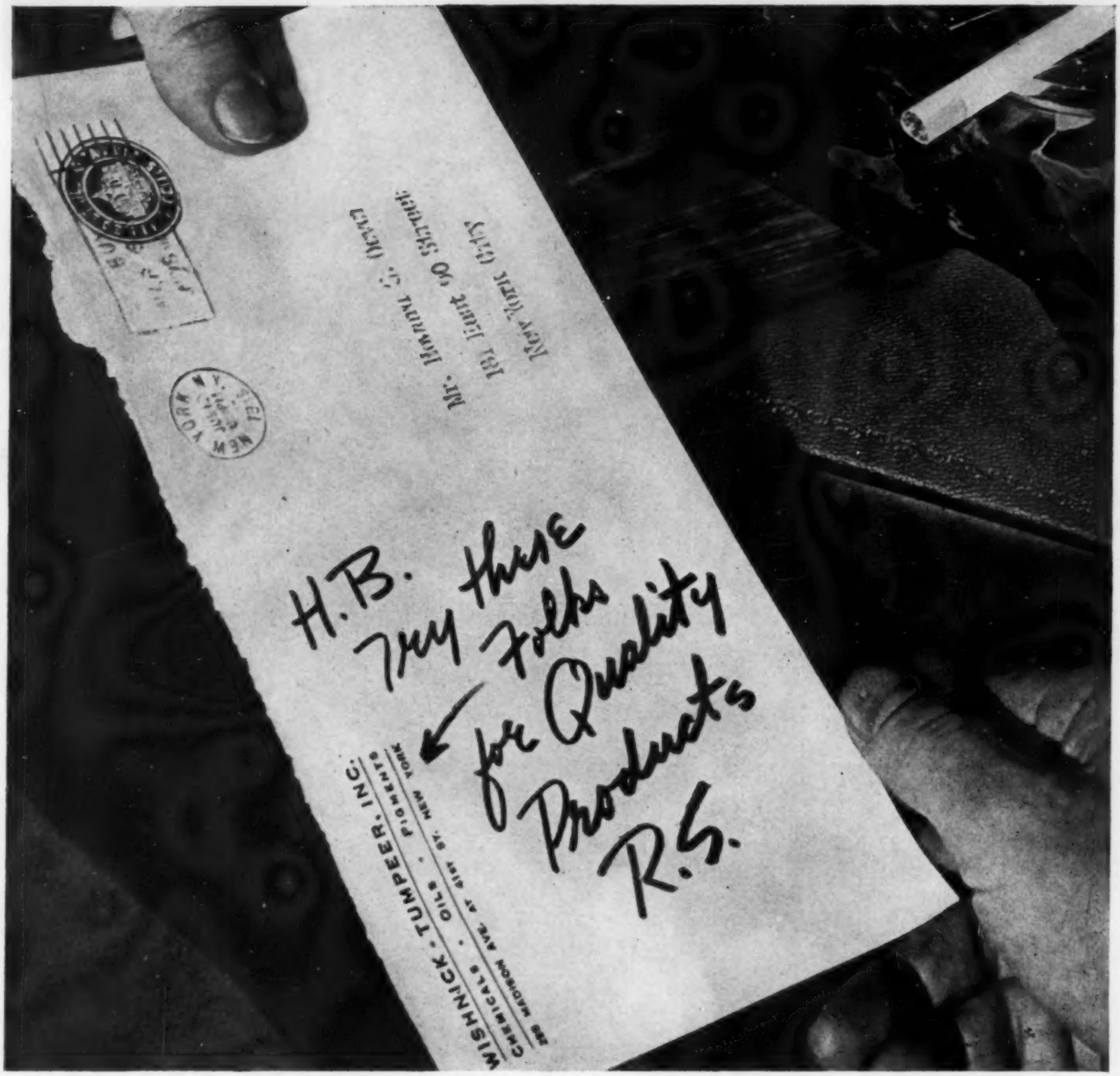

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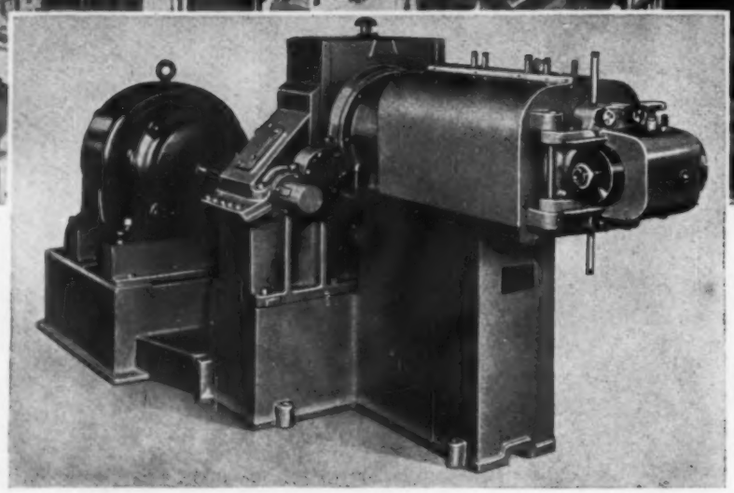

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VOL. 53, No. 5 AUGUST, 1943

Observations on the Toxic Effects Resulting from Exposure to Chlorinated Naphthalene and Chlorinated Phenyls with Suggestions for Prevention

By DR. H. VON WEDEL, DR. WILLIAM A. HOLLA*, AND DR. JAMES DENTON

Department of Pathology, White Plains Hospital, and the Department of Health, Westchester County, New York

FOR over twenty years chlorinated naphthalenes have been extensively used for insulating wire and in the manufacture of certain electrical equipment. Chlorinated naphthalenes and chlorinated phenyls (sold under the trade names of Halowax and Arochlor) have marked electrical, heat and moisture resisting properties, and are practically non-inflammable. Their use in the manufacture and preparation of many types of electrical equipment has been tremendously increased, due to the enormous increase in the use of such equipment for the prosecution of this present world war.

In some mills hot concentrated Halowax is used to saturate wire insulation, while in other mills the compounds are dissolved in organic solvents, the solutions then being used cold to saturate the insulation. In both these processes the wet insulated wires are dried in drying tubes or ovens. During this drying process dangerous concentrations of chlorinated compounds are given off.

It has been known for many years that these compounds cause acne-like eruptions. In recent years serious systemic effects have been recognized. During the past year many cases of skin eruption and in addition six fatal cases of a peculiar type of subacute yellow atrophy of the liver have occurred among the workers in two wire and cable mills. At the request of the management of one of these mills and in cooperation with the Department of Health of Westchester County (N. Y.), one of the authors undertook an investigation of the mill in order to advise the management and the Department of Health as to means of prevention of the cutaneous lesions and systemic effects resulting from these toxic hydrocarbons. This mill used the cold process for saturating the wire insulation.

As the study progressed, it became apparent that the toxic lesions resulted from inhalation by men working in or near the drying ovens and also by some other method of absorption, presumably through the skin. This fact was clearly shown, because many of the acne-form eruptions occurred among the men operating the saturation baths and not exposed to the inhalation hazard. A few of the acne-form eruptions occurred among workmen handling the cold finished wire in a mill-room far removed from any possible inhalation

*Commissioner of Health, Westchester County, N. Y.

hazard. Women working in the same mill rooms with the affected men showed no acne-form eruptions. None of these women handled the toxic substances.

An investigation was begun to determine what systemic effects would result from the administration of these substances to experimental animals by inhalation, ingestion and by surface application of the substances to the skin. This article describes pathological changes observed in man and experimental animals resulting from absorption of these toxic substances, and suggests means of preventing this absorption.

Historical

Lehmann in 1919 *(1)* found that animals which were fed or which inhaled chlorinated naphthalenes lost appetite and at death showed peculiar lesions in the liver.

Flinn and Jarvik *(2)* in 1936 reported three cases of yellow atrophy of the liver occurring in three widely separated plants. Experimental studies on rabbits, using different compounds of chlorinated naphthalenes, indicated that the toxicity of these compounds increases with the increasing degrees of chlorination.

Flinn and Jarvik *(3)* later reported nine cases of yellow atrophy of the liver occurring in mills where chlorinated naphthalenes were being used to impregnate wire and other electrical equipment. They concluded that the cases of yellow atrophy of the liver occurring among the employees were probably due to exposure to chlorinated naphthalenes.

Drinker, Warren and Bennett *(4)* in 1938 described the morphological changes in the livers of rats exposed to chlorinated naphthalenes and chlorinated phenyls. These investigators administered the toxic substances by inhalation, feeding and subcutaneous injection. They found that the tri and tetra chlorinated naphthalenes produced only slight pathological changes in the liver, unless extremely high concentrations were used. However, animals exposed for six weeks to the higher chlorinated naphthalenes in low concentrations regularly showed marked liver damage, even though they gave no clinical evidence of such toxicity before death. The toxicity of each compound seemed directly related to its degree of chlorination.

Widespread liver degeneration can exist for several months without producing any evidence of ill-health in the animals, suggesting that the alterations take place slowly. Animals given a sublethal dose of chlorinated compounds, when given a very small dose of carbon tetrachloride immediately died, even though such a small dose of carbon tetrachloride given to a normal animal would not materially affect it. Exposure of rats to either highly chlorinated naphthalenes or chlorinated diphenyl results in a type of liver injury differing considerably from the liver lesions resulting from carbon tetrachloride *(5, 6)* and chloroform *(7)* poisoning.

The changes resulting from exposure to the compounds employed in their study involved all portions of the liver lobule, even though the initial morphological changes were more pronounced in the liver cells nearest the hepatic veins. The changes were degenerative in nature, first cloudy swelling then fatty infiltration and fatty degeneration. Complete disintegration of the cells with areas of necrosis finally resulted, regardless of the method of administration. This degeneration was characterized by accumulations of large amounts of acidophilic hyaline material. The characteristics of the liver changes produced can be markedly altered, quantitatively and qualitatively, by varying the degree of exposure. Blood examination during life revealed no significant abnormalities, and the injurious effects of these compounds were manifested solely in the liver.

The investigators concluded from their experiments that lower air concentrations must be obtained in the case of the more highly chlorinated naphthalenes and chlorinated diphenyls, than for trichlorinated naphthalenes, if a safe environment for workmen is to be assured.

Yarglou, Sands and Drinker *(8)* reporting on the ventilation of wire impregnating tanks using chlorinated hydrocarbons, showed that the requirements for the ventilation of such tanks varied greatly with the type as well as with the size of the tank. They suggest that an exhaust slot about 2 inches high extending along the full length of the tank with lateral ventilation was the most effective method of ventilating such tanks. For any given concentration of chlorinated naphthalene the degree of chlorination had no appreciable effect on ventilation requirements.

Greenburg, Mayers and Smith *(9)* in 1939 reported three cases showing the occurrence of similar pathological changes in the liver in three young adults known to have been working with chlorinated naphthalenes and diphenyls. They briefly summarized the systemic effects resulting from this exposure and made recommendations for prevention.

Drinker *(10)* in 1939 reported further observations on the possible systemic toxicity of certain of the chlorinated hydrocarbons. From this study he concluded that the permissible limit for air contamination with trichlor naphthalene was 10 mgm. per cu. m.; for tetra and penta chlor naphthalene, 1 mgm. per cu. m.; for penta and hexa chlor naphthalenes, 0.5 mgm. per cu. m.; and for the various chlorinated diphenyls 0.5 mgm. per cu. m.

Cleary, Maier and Hitchings *(11)* in 1938, reporting on the metabolism of chlorinated naphthalenes, stated that no significant storage of the material could be detected in lung, liver, skin or kidney, nor was any significant amount excreted in the urine. Both the rat and the dog apparently were able to remove and excrete the chloride promptly. A rise in the urinary ethereal sulphate fraction, but no significant change in the neutral sulphur excretion, was noted after chlorinated naphthalene feeding in the dog.

Riley *(12)* in 1943 stated that poisoning may result from inhalation of vapors, from prolonged skin contact with the vapor, liquid or solid phase, and from ingestion of the chlorinated material.

Cranch *(13)* in a recent personal communication to one of the authors, stated that the effect of these waxes on the skin resulting in the appearance of acne is not determined by the presence of chlorine alone, but is due rather to the compound effect of chlorine and a tar derivative. No such marked tendency to acne formation results from exposure to chlorinated petroleum derivatives, such as chlorinated paraffin. When chlorinated naphthalene is combined with chlorinated diphenyl, a more active acne is produced. Liver damage is not likely to occur following exposure to chlorinated naphthalene alone, but may occur from exposure to chlorinated diphenyl combined with chlorinated naphthalene or other tar derivatives. The severity of the acne is not correlated in any way with the degree of liver damage which might occur.

Cranch suggests that other factors are probably in-

volved in the cases showing liver damage, besides exposure to chlorinated waxes alone. The important point brought out in this communication was the fact that skin reactions with acne formation have been noted in men handling only the finished product, with no appreciable vapor exposure. As far as he knew, no liver cases had been attributed to skin absorption. He suggests that the absorption of these materials through the skin is very slow as compared with inhalation absorption.

Cranch also suggests that prevention depends first on the greatest possible reduction of vapor exposure and skin contact; second, on protection of the skin by means of cold creams and adequate bathing..

Toxic Effects in Man Resulting from Exposure to Chlorinated Naphthalenes and Diphenyls

It has long been known that chlorinated naphthalenes and diphenyls are skin irritants. The lesions have been described by Schwartz *(14)* and others. The effects are first noted on exposed parts—either from fumes or from direct contact with the chemicals. Contamination of clothing results in more generalized distribution of the irritant effects. In workers with greasy skins and hypertrophied sebaceous glands, the effects are more frequent and prompt. After exposure of about six months, few workers fail to develop lesions.

The skin affection usually begins as a generalized folliculitis. Occasionally there is diffuse pigmentation of the skin of exposed areas. Later comedones, acne-like pustules and sebum cysts develop. These latter lesions tend to be chronic and on healing may leave permanent scars. Generalized papulo-pustular eruptions have been described. In the cases observed in this mill the skin lesions have been confined to the extensor surfaces of the arms, the back of the neck, the mandibular surfaces of the face, and along the hair margins. The lateral surfaces of the thighs have frequently been involved.

In addition to the skin lesions, symptoms of systemic poisoning have appeared in some workers. The first complaints are digestive disturbances, burning of the conjunctivae, and in some instances sexual impotence and haematuria.

It is not known just how frequently fatal poisoning results from absorption of these chemicals. It is worth noting, however, that six workers, formerly employed in these two mills, have been studied post mortem. One of the post mortems was performed by one of us and the other five by pathologists in this industrial area. We have had the privilege of examining the pathological material from some of these necropsies. In these six cases, death was in every instance due to subacute liver necrosis.

Since subacute liver necrosis is an uncommon disease and since all six workers had been exposed to absorption of the chemicals in Halowax and Arochlor, it is logical to suppose that these chemicals were the cause of the liver necrosis. In all these cases the livers were much reduced in size. Their weights ranged from 400 grams to 1100 grams. A review of the pathological changes in the autopsy material shows nothing of much significance, except in the livers. The hepatic lesions varied in character and intensity in the different cases, apparently depending upon the susceptibility of the different subjects, or possibly upon the length of time of exposure to the toxic agents.

All the livers were markedly distorted in shape, coarsely granular and mottled in yellow and red. For the most part they were very firm, although some showed large soft red areas. On section, their cut surfaces varied from mottled yellow and red with scattered necrotic areas to large yellow-gray areas showing small necrotic centers. In our case, there was a complicated melange of liver necrosis and cirrhosis. In all of the cases, however, there were large areas of degeneration and necrosis. The distinctive feature of this chemical intoxication is, clearly, liver necrosis. The cirrhosis and scarring are apparently attempts at repair.

In the autopsy material it is difficult to determine what portion of the liver lobule is primarily affected. In some the whole lobule is involved, while in others the lobules are so deformed that definite localization is impossible. In general, it appears that in the more acute cases, necrosis of the liver cells is the prime feature. In the more chronic cases the liver necrosis was complicated by scarring repair and regeneration of liver lobules.

Experimental

Materials employed: In the animal experiments which we have conducted, the chemicals used were those regularly employed in and supplied to us by the mill for this purpose. They were Halowax and Arochlor in concentrated state and dissolved in naphtha and troluoil. The effects of the solvents alone (naphtha and troluoil) were also studied. In these experiments white mice, guinea pigs and rabbits were employed.

Three routes of introduction of the chemicals have been used—*viz:* by inhalation, by ingestion and by application to the skin. The first two avenues of absorption have been extensively investigated by other workers, but to the best of our knowledge there has been no systematic study of the systemic effects of skin absorption of these chemicals. Observation at the plant leads us to the conclusion that the skin is an important avenue of absorption of these chemicals. Therefore we have in our experiments directed particular attention to this mode of absorption. The inhalation and feeding experiments which we have carried out have conformed to the methods outlined by Bennett, Drinker and Warren *(4)*. They have proven useful, as controls, in gauging the importance of lesions produced by skin absorption.

The skin absorption experiments were performed for the most part with rabbits. Approximately 9 square inches of the hair on the backs of a series of rabbits was removed with clippers, the remaining hair shaved off and the resulting small skin abrasions allowed to heal for three days. These experimental animals were kept in cages alongside normal control rabbits. ½ ml., 1 ml., and 1½ ml. of diluted Halowax and Arochlor, containing 0.8 grm. dry Halowax per ml. and 0.6 grm. Arochlor per ml., respectively, was dropped on the shaved areas by means of a calibrated syringe. After allowing the chemicals to partially dry for about five minutes, the animals were returned to their cages. The substances were administered daily, in the above-described manner. Because of possible criticism that some of the chemicals might have been absorbed by ingestion or inhalation, this entire series of experiments was duplicated, following the same procedure cited above, but with the precaution of covering the application areas with molded celluloid guards.

These celluloid guards were made by cutting and bending sheet celluloid into proper shapes and binding their sharp edges with adhesive tape. After each daily skin application the guards were replaced and firmly strapped in place with adhesive tape passing completely around the animals' bodies. This procedure, we believe, precluded any possibility of inhalation or ingestion of the toxic substances. In no instances were the guards removed or loosened by the animals' movements in their cages. To avoid skin irritation the inner surfaces of the guards which might come in contact with the skin were coated with vaseline.

A third series of skin absorption experiments was conducted in a similar manner, except that before the daily skin applications were made the shaved areas were covered with a thin layer of Protek. This substance is a cheap and apparently efficient type of cold cream used by mill workers.

After experiments with naphtha and troluoil alone, extending over four months, no animal showed any skin lesion resembling those caused by Halowax or Arochlor, either by inhalation, ingestion or skin absorption, and no animal died of whatever mild effects these substances might have caused. We therefore felt that the acne and the systemic effects observed in the remaining experimental animals could not have been caused by either naphtha or troluoil. The results of all three methods of absorption with both chemicals showed essentially the same type of skin lesion and liver necrosis. It was found that the rabbits were more uniform in their reactions, and the dosage could be more easily evaluated. Therefore, all the last experiments were made on rabbits. The extent of the skin lesions and liver necrosis depended on the size, frequency and number of inoculations.

Animals inoculated with large doses every day, whether by inhalation, feeding or skin absorption, died before definite liver necrosis developed. Animals inoculated with moderate and small daily doses lived for longer periods, and at necropsy showed skin lesions and subacute yellow atrophy of the liver, simulating the lesions observed in man. Animals sacrificed after a short series of small doses, showed slight to moderate degrees of liver degeneration, evidenced by fatty infiltration.

Four to five days after the first dose of chemical was dropped on the skin, all regrowth of hair was completely destroyed. The skin became markedly reddened, small papules and blisters formed, and finally the external epidermal layers desquamated. Some pustular lesions developed which were very similar to those seen in man. On necropsy, the livers of the animals were the only viscera showing any definite changes. The animal livers varied in appearance. Externally they were mottled in red, yellow and brown. They were finely to coarsely granular, and showed no marked abnormality in size. On section, the livers of the animals receiving the smallest dosage showed only a change in color, being more or less diffusely yellow with no gross evidence of necrosis. In animals receiving larger or more numerous doses of the toxic substances, there were opaque yellow areas of necrosis scattered throughout the liver substance.

The lesions were definitely degenerative in type, ranging from moderate degrees of fatty degeneration to marked hepatic degeneration and necrosis. Those resulting from skin absorption of Halowax and Arochlor were essentially identical to the lesions produced by inhalation of these substances. The rabbits treated with Protek before application of the chemicals to their skin, were partially protected and the chemical absorption retarded. There were similar but milder skin and liver lesions. Normal control animals kept in identical environment as the experimental animals developed no skin lesions and showed no fatty degeneration or liver necrosis at autopsy.

Methods Recommended to Safeguard Workers Exposed to Chlorinated Napthalenes and Diphenyls

The first step taken should be the formation of a working committee consisting of the superintendent, the chief engineer, the chief chemist and the consulting or plant physician of the mill. This committee should formulate practical changes, wherever found necessary, to as far as possible protect the workers from the hazards of these toxic compounds. Because of the urgent need for these critical war materials, no changes should be advocated which will in any way slow down or prevent the greatest possible productivity of such important mills.

Protection must consist of prevention from inhalation, ingestion and skin absorption of these chemicals. Skin absorption, while long recognized as causing acne-form eruptions, has not in our opinion received proper consideration from the standpoint of systemic effects.

Toxic effects from inhalation are without question the most important because of the speed of absorption and the probable high dosage of toxic substances absorbed. Therefore, adequate ventilation is the primary consideration in any mill. The mill rooms and mixing house should be ventilated by intake and exhaust fans of sufficient volume and velocity to remove the majority of the fumes.

The drying tubes and drying ovens should be adequately ventilated and sealed as nearly air-tight as practicable. To accomplish this, large intake vents should be placed near the floor in the doors of the drying ovens. Large high-velocity exhaust fans and an adequate number of large exhaust stacks leading up above the roof of the mill should be installed. After the steam in the drying ovens has been turned off, fresh cool air from the mill room should be pumped through the ovens for a sufficient time, in sufficient volume and of a velocity of approximately 2000 cub. ft. per minute, to bring down the temperature of the drying ovens to that of room temperature, before opening their doors to unload.

Daily analysis should be made of the air in these ovens. They should not be opened for unloading until chemical analysis reveals less than 0.5 mgm. of chlorine, expressed as Halowax or Arochlor, per cubic meter of air. The drying tubes surrounding the wet impregnated cable should be ventilated by suction applied at the far end of the tubes. The air flow through the tubes should be sufficient to cool the saturated cable to a temperature at which no significant amount of vapor is given off from the cable after it leaves the drying tube.

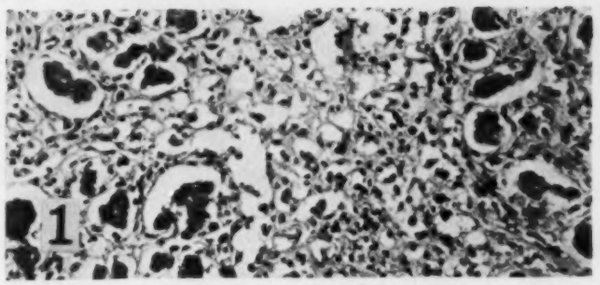
The impregnating vats should have permanently hinged covers fitted with flanges that extend downward inside the tank, to avoid soiling the outside of the tank from dripping. These vats should be completely enclosed in a ventilation hood, with a hinged door in front. These hoods should be ventilated through a properly constructed lateral exhaust ventilation system. Yarglou, Sands and Drinker *(8)* recommend an ex-

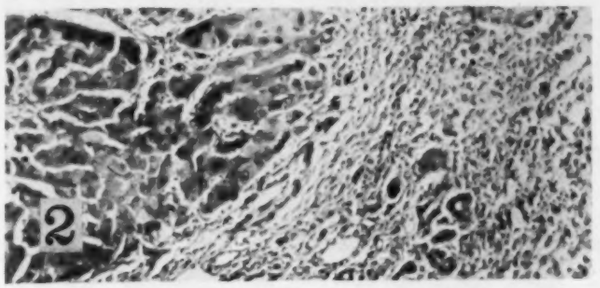
haust slot approximately 2 inches high extending along the back, the full length of the tank, placed approximately 6 inches above the level of the liquid wax in the impregnation vat. Various speeds of exhaust should be tried, until the proper speed is indicated by chemical analysis of the air in front of each hood.

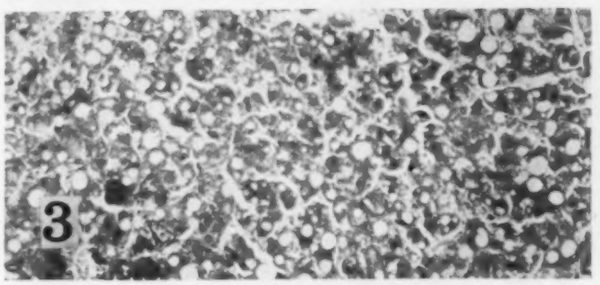
In the cold process, Halowax and Arochlor are dissolved or diluted with solvents in mixing vats. The Halowax and Arochlor should be introduced into these vats with as little manual handling as possible. The vats should be kept covered at all times with a hinged cover, except when actually being filled. The workmen should not be allowed to place their hands inside these vats, even for taking the specific gravity of the mixtures. This can easily be accomplished by a long-handled glass thief introduced through a small opening in the cover of the tank. The specific gravity should be observed outside the tank, after removing the thief. The chemicals should be pumped outside of the mixing house to a loading platform through permanent pipes fitted with proper gate valves. Such pipes should be connected by proper couplings to tank trucks.

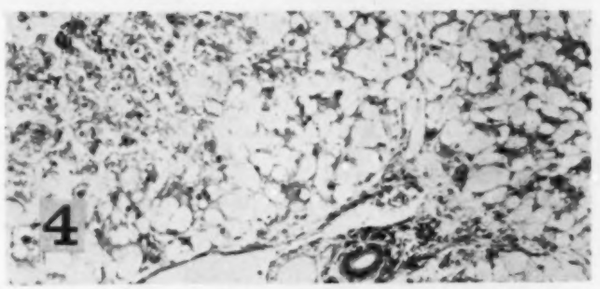
The tank trucks filled with the chemicals should then be driven to the felting mills, where they are emptied into conveniently located distribution tanks. The chemical compound should then be pumped or fed by gravity from the distribution tanks to the impregnation vats through appropriate sized pipes, not less than 2 inches in diameter. Separate lead pipes should extend downward to the vats from the main feed lines. Each pipe, just before it empties into the impregnation vats, should have a gate valve the full size of the pipe and of simple design so that it cannot become clogged by the mucilaginous fluid.

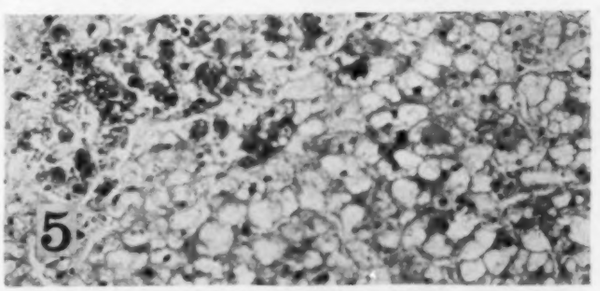
After the fluid chemical in the impregnation vats becomes contaminated by too much asbestos debris, the sludge remaining in the tank should be exhausted through exhaust pipes at least 4 inches in diameter, connected at or near the bottom of each impregnation vat. Such exhaust pipes should be attached at an angle leading out from the back of the vats and extend into receiving sludge vats with a simple gate valve the full size of the pipe placed near their lower ends. The remains of the asbestos sludge, which does not flow











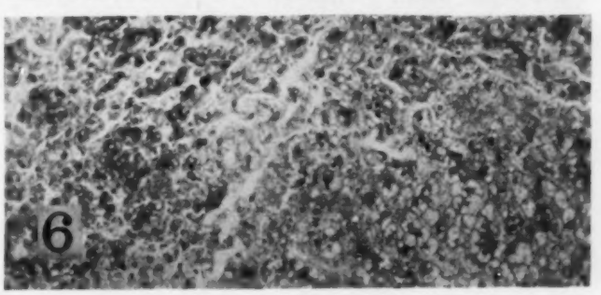


FIG. 1—Human Liver: Late effects of liver necrosis. Bile ducts and capillaries, no liver cell regeneration.

FIG. 2—Human Liver: Right half of the field shows destroyed liver lobules without repair, the left half of the field shows regenerated and degenerating liver cells.

FIG. 3—Rabbit Liver: Effects of skin absorption of Arochlor—moderate dosage—half of the liver cells are opaque and granular, the other half contains large fat droplets. The darker areas are haemorrhage.

FIG. 4—Rabbit Liver: Effects of inhalation of Halowax—18 doses—showing complete liver necrosis.

FIG. 5—Rabbit Liver: Effects of skin absorption of Halowax, showing complete liver necrosis.

FIG. 6—Rabbit Liver: Effects of skin application of Halowax after application of Protek, showing partial liver necrosis.

through the pipes, should be scraped out of the vats and pushed into the sludge vats by means of a long-handled square-ended steel paddle. If the exhaust pipe should become clogged by the thick mucilaginous substance, a 4-foot long steel push rod with a 3-inch flat bell at its end should be used to push the obstructing sludge into the receiving vat. Both the paddle and the push rod should be stored in a vertical metal container.

The sludge vats should be of the correct capacity to receive the largest amount of sludge that may be exhausted into them, and of appropriate height and diameter, so as not to obstruct the passage ways. All such vats should be interchangeable. The tops of these vats should be constructed so that their entire top, with the exception of a 1-inch overhang rim, is open. A slide sleeve should be placed in this overhang rim. A strong metal sliding cover should be provided for each vat. An opening to receive the metal pipe should be placed in the slide cover, fitted with an angle extension to receive the solid 4-inch pipe from the saturation vat.

After the sludge vats have sedimented for an appropriate time, the good fluid Halowax should be pumped into receiving tanks through a pipe containing a glass observation window. After all the good chemical has been removed from the sludge vats, the remaining sedimented sludge should be dumped into burial ditches by placing the vats in an automatic dumping machine, so that no hand will have to touch the edges of the vats. The vats should not be cleaned out until their inside surfaces become covered with too much hardened chemical. The hardened sludge is then softened with an appropriate solvent and scraped off the sides of the vats with a long-handled square-ended steel paddle.

Elbow-length, thin, impermeable gloves should be used by the men when they adjust the nuts and screws of the mechanism in the vats. They should be taken off immediately, when the men have finished the job, to avoid excessive perspiration. The outsides of the impregnation vats should be frequently washed down with a proper solvent, to keep them free from the toxic chemicals.

After the above recommendations have been followed out, the personal factor has been almost completely eliminated. Clean working clothes, consisting of long-sleeved overalls fastened at the neck and wrists, should be provided. These clothes should be laundered frequently, daily if possible.

All eating of lunches, etc., should be forbidden in the workrooms. Candy, cigarettes, chewing gum and other vending machines of such nature should be placed in recreation rooms that should be provided for the workers.

In and out locker rooms and shower baths should be installed, so that the workmen coming to work leave their street clothes in the outside locker room and pass through the shower room to the inside locker room, where they put on their clean work clothes and cover their hands, faces and necks with some type of cold cream or skin lotion. They should then be checked out by a checking system before they are allowed to go into the mill. When leaving work for lunch, they should be checked back through the inside locker room, where they should thoroughly wash their hands, faces and necks with soap and water before going to lunch. If they are going home they should also check through the inside locker room, where they leave their soiled clothes, take a complete hot soap shower bath (therefore sufficient shower baths should be provided) and are then checked out to the outer locker room. Here they put on their street clothes. This not only protects the workmen, but also their families, as it has been shown (*14*) that wives handling and washing such clothes and children playing with their father while he was wearing the soiled work clothes acquire the same type of skin lesion as the workmen themselves.

All new workers should be examined by the mill physician, and all men and women with a history of previous jaundice, liver diseases or skin diseases should be rejected or should be placed in departments where toxic substances are not handled. All workers in the mills where cables saturated with chlorinated naphthalenes and phenyls, whether wet or dry, are handled, should be periodically examined for skin lesions and systemic effects. No women who are pregnant should be allowed to work in these rooms, as they are notably very susceptible to liver toxemia. All workers in these mill rooms and all new employees should have frequent periodic laboratory tests made to determine whether or not any liver disfunction is present. Such laboratory examinations should include Hanger's Cephalin-cholesterol flocculation test, bilirubin content of the blood serum, and icteric index. If any one of the three show results exceeding the normal limits, the worker should be re-tested within one week and if such abnormality persists or increases such workman should be removed from this toxic hazard at once.

As it is a known fact that other conditions, such as gastro-intestinal upsets, etc., may cause one or more of these tests to show transient moderately abnormal findings, the first test should not be considered conclusive, nor should such workmen be barred from their work until such abnormal findings persist or increase.

At present the New York State laws relating to health in industrial plants are placed under the jurisdiction of the State Department of Labor and the local health department. Where a county health department has been established or where a properly functioning city department exists most of the health hazards in industry could be handled more readily by the local department than by the state. This is due to the fact that the state has but few employees to cover a large area, while the local health department is immediately available and often more familiar with local conditions and hence able to keep in closer contact with the industry and over a long period of time if necessary.

Laws should be passed making it necessary for medical directors of industrial plants to report at once all toxic disease conditions relating to industrial employment directly to the local health department, who would then make an investigation of existing conditions and, if possible, arrive at the solution of the difficulty, then make the necessary recommendations to the industrial plant, also furnishing the State Department of Labor a report of the investigation and the recommendations made. In cases where the investigation discloses that more extensive work is needed or the services of specialists required, the Department of Labor should then be called upon to complete the work. In this manner the state could be saved considerable time and trouble and be able to devote itself to more intensive work in other plants where its services were more urgently needed.

The responsibility for the enforcement of the laws relating to protective measures in industrial plants should be placed upon the local health departments.

In localities where no competent or responsible health department exists, the investigation and enforcement should be made by the Department of Labor.

At present in Westchester County there is a sanitary code established by the County Health Department which covers the regulations relating to food handling, food inspection, dish washing, management of cafeteria in general, together with sanitation and water supplies. These regulations are enforceable by the County health authorities and are in addition to those covered in the state sanitary code.

Only by compulsory reporting of all toxic industrial conditions and the cooperation of the state and local departments with the industry can these conditions be eliminated. The plant management must be assured that the aim of such procedures is to aid them and that production will not be interfered with.

Discussion

For over twenty years reports have been published dealing with the toxic hazards of chlorinated naphthalenes. Every one agrees that definite systemic effects can occur from inhaling or ingesting these toxic substances. There is also general agreement regarding the acne-form eruptions that are caused by skin contact to them. To our knowledge no one has stressed the importance of the systemic effects caused by skin absorption.

Therefore this publication is primarily concerned with the systemic effects caused by skin absorption. It is very difficult in humans to prove that systemic effects occur from skin absorption, because the workmen quite naturally are subject not only to skin absorption but also to the hazards of ingestion and inhalation. Workmen in mills far removed from inhalation hazards and working only with the cold finished impregnated wires and cables, have in many instances acquired acne-form eruptions due to these chlorinated naphthalenes and chlorinated phenyls. None of these workmen, as far as we can ascertain, have shown recognizable systemic effects due to their absorption. This is understandable, as we know that liver function tests only show definite results when an appreciable liver degeneration has occurred. None of the six fatal cases showed any evidence of jaundice or other systemic effects until a few days to a week before hospital admission. They were in contact with these toxic substances for periods ranging from two months up to nine months. They all died within one to three weeks after hospital admission.

All of our experimental animals showed definite liver degeneration or necrosis in varying degrees, whether or not they were protected by Protek, when liquid chlorinated naphthalene or diphenyl was administered by dropping it on their shaved skins. Every precaution possible was taken to safeguard these animals against the toxic effects of inhalation and ingestion.

Parallel experiments were conducted by inhalation, by feeding and by skin absorption. All three series of animals showed the same type of liver degeneration. The difference in liver lesions found depended entirely on dosage and number of inoculations. During these experiments, none of the animals showed recognizable systemic effects until a few days before death. The animals killed during the course of the experiments showed no recognizable effects. Every animal killed showed some degree of liver degeneration. Normal control animals showed no liver lesions.

The experiments cited indicate that chlorinated naphthalenes and diphenyls cause systemic effects in animals whenever they absorb these toxic substances, whether by inhalation, ingestion or skin absorption. It would therefore seem probable that if experimental animals react in this way, man will also.

Because of the aforementioned facts, recommendations were made to the mill and were to a great extent followed out. For the past five months, not one single case of skin eruption or systemic disease, attributable to these toxic compounds, has occurred in this mill. Two deaths and between fifty and one hundred cases of acne-form eruptions occurred in this mill within the previous six months, before these changes were instituted. Therefore, the practical evidence would seem to indicate that if the above recommendations are carried out workmen will be almost completely protected. The cost of such changes will be quickly absorbed by the saving in man-hours, lowering of insurance rates and greater efficiency of the workers. The relations of the workers towards the management must of necessity be vastly improved.

Summary

1. Studies concerning the toxic effects of chlorinated naphthalenes and diphenyls on experimental animals are reported.
2. These studies were undertaken because of the occurrence of acne-form eruptions and deaths among workmen in two wire and cable mills where these compounds were being used.
3. The compounds experimentally studied were administered to animals by inhalation, ingestion and skin absorption.
4. Liver degeneration in experimental animals is caused by skin absorption of either chlorinated naphthalenes or chlorinated diphenyls.
5. Histological examination of the viscera of these experimental animals showed that important toxic effects are manifested only in the skin and liver.
6. The liver degeneration has been described and illustrated.
7. The degenerative effects in the liver have been shown to be essentially identical regardless of whether the toxic substances were administered by inhalation, ingestion or skin absorption.
8. Methods are recommended to safeguard workers in mills using these toxic compounds.
9. Laws should be passed making it compulsory for all mills using toxic chemicals to adequately safeguard their workmen from such toxic hazards.
10. Inspection of the plants and authority to enforce protective measures should be placed under the Department of Health.

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Reanite Bonding Process

A NEW method of bonding natural or synthetic rubber to metal, or plastics to metal, recently announced by the U. S. Stoneware Company, Akron, Ohio, manufacturers of Tygon synthetic materials and corrosion-resistant equipment, is reported to not only do away with costly brass plating processes, but to develop a bond from three to five times as strong. The new method, known as the Reanite Bonding Process, develops a bond between rubber and metal ranging from 900 lbs./sq. in. to as high as 1200 lbs./sq. in. on a pull test. This compares with bonds ranging from 250 to 400 lbs./sq. in. obtained by present methods.

While the bond develops its maximum strength at room temperatures, its strength over a range of —40°F. to as high as 300°F. is said to be substantially stronger than bonds obtained by conventional processes. A national independent research laboratory, using methods similar to those specified by ASTM, reported as follows: "Discs of rubber, half an inch thick, were vulcanized between two steel discs, two square inches in area, which had been cleaned and coated with Reanite cement. The direct pull necessary to tear the assembly apart was then determined (a) at room temperature, (b) immediately after immersion in boiling water for five minutes, and (c) after heating for 30 minutes in an oven at 300°F. The following figures are typical of tests made during the year, although in a considerable number of cases still higher figures were obtained."

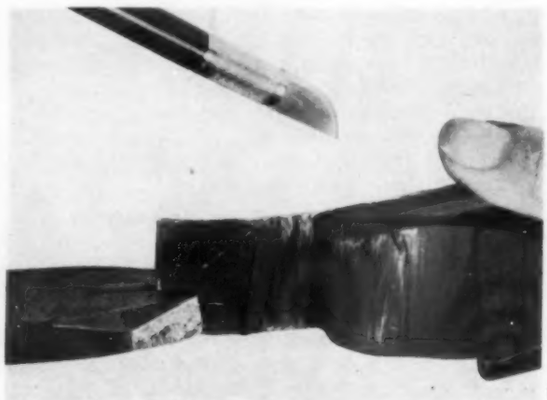
Test of Bond Separation

Hardness of Rubber	*Strength of Assembly (in pounds)*		
(Shore)	*Room Temperature*	*212°F*	*300°F*
50	1885	595	360
60	1912	592	367
50	1890	560	312

The Reanite Bonding Process is suitable for bonding natural or synthetic rubber, or plastics, to almost all metals: iron, steel, stainless steel, magnesium, aluminum, aluminum alloys, copper, bronze or brass. The accompanying illustration shows a test sample of aluminum, 5¾ in. long by 1½ in. wide by 1/16 in. thick bonded to tire tread rubber ¼ in. thick. The rubber was cut away from a portion of the aluminum strip, and conventional line-pull tests were applied. Standard specifications call for such an assembly to withstand a direct pull of 19 pounds. On this test no separation of the bond occurred under pulls well above 300 pounds.

The process is simple in application. The surfaces to be joined are brushed, sprayed or dipped with Reanite. After being permitted to dry for an hour the surfaces are joined and the unit vulcanized by any of the conventional methods. It may also be used to bond metal to metal, or leather or wood to metal or to each other. The bond—metal to metal—ranges from 1,000 pounds to as high as 3,000 lbs./sq. in. on a combined shear-pull test. On bonds formed between synthetic rubber and metal, plastics and metal, or wood and metal, the materials themselves gave way before the bond.

The Reanite joint is unaffected by fresh or salt water, is non-corrosive to metals, possesses excellent corrosion-resistance in itself, and has high dielectric strength. While Reanite is formulated through cyclic modifications of materials high on the critical list, it is available for immediate shipment for essential end-uses. Present applications include fabrication of airplane assemblies, motor mounts, sound and vibration dampeners, instrument mounts, composite metallic and plastic units, and tank lining assemblies.



Test sample of aluminum, 5¾ in. long by 1½ in. wide by 1/16 in. thick, bonded to tire tread rubber of ¼ in. thickness by the Reanite Process. In the test (see text), no separation of the bond occurred under pulls well above 300 pounds.

Development of Rubber in Tropical America

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SIMULTANEOUSLY today move two great rubber developments of far-reaching importance to the economic future of the Americas. These are the creation in the United States of a synthetic rubber industry and, in the tropical Americas, development of natural rubber production. Which of these two will win out in the long run? The answer holds a large meaning for the Americas. Rubber is indissolubly bound up with the economic destinies of the hemisphere. What rubber means to our motor and machine age has been well illustrated in the repercussions for the loss of rubber supplies in the Far East.

Right now the important thing is to get rubber. We must get it from any and every source available, natural and synthetic, as quickly as possible. That is all that matters immediately. Without rubber, the United Nations war machine and the civilian economy of the Americas would be severely handicapped. Lack of rubber can prolong the war. Lack of rubber can cause infinite confusion in civilian life, as we know only too well. Still it is worthwhile to examine now the challenging question: Are we to rely for the long-range upon natural or synthetic rubber?

Science Holds the Answer

Perhaps the answer to this challenging question lies in the test tubes of patient chemists, in the research and experiment stations of the tropical Americas which are producing strains of disease-resistant and higher-yielding rubber trees. Science holds the answer—science in the industrial laboratory and science in agricultural experiment stations. Which will win in the long run: the science of the industrial laboratory or the science of modern agriculture? The chemist has produced many fateful changes in our economic life in the last two decades. But probably no single development holds more potent possibilities than the race between the chemist and the agricultural scientist to supply the expanding needs of the Machine Age for rubber and to supply it cheaply and abundantly.

As director of the newly-established Inter-American Institute of Agricultural Sciences, at Turrialba, Costa Rica, I am identified with the scientific effort to grow natural rubber in the Western Hemisphere, to produce it economically so that American rubber growers may hold their own in the long-range test for survival, so that they may meet competition from any quarter—whether from improved synthetic rubber or from low-cost natural production outside the Western Hemisphere. I have faith in the ability of American rubber growers to hold their own, once they get well started with improved strains of rubber trees. I believe the costs of growing natural rubber in the Western Hemisphere can be reduced beyond anything which has been demonstrated heretofore. And, in that firm belief, I am hoping that natural rubber will have full opportunity to prove its capacity to survive, whether the competition comes from the ingenious chemist or producers able to draw upon large reservoirs of low-paid labor outside the Western Hemisphere.

I shall not attempt to narrate, or to analyze, all the developments going on now in rubber. Much of the rubber program for immediate war needs is concentrated on efforts to increase quickly production of wild rubber in the Amazon basin and in Central America. The program also includes large projects for production of rubber from quick-growing plants such as cryptostegia and guayule. I am concerned here mainly with the story of what is being done to put natural rubber production on a sound basis for the long run, with the possibilities for developing small unit plantations, with the question whether natural or synthetic rubber will become our chief source of raw material.

View of test planting at the Brazilian Agricultural Station in Belem, Brazil.

There can be little doubt, I am sure, that the lessons of this war will count heavily in our long-range policies on rubber. We have learned by bitter experience the dangers of dependence upon distant sources of rubber when we can produce rubber at home or near to home. I am assuming that in the post-war period we shall want to rely—certainly more than before the war—upon nearby sources of rubber. That will mean natural rubber from the tropical Americas or synthetic rubber from plants now rising in the United States. Perhaps these in combination will be the answer. For one thing, it must be recognized that rubber consumption in the other Americas is growing. If this trend continues, as appears likely, the other Americas will see more and more of their own natural rubber production.

It also must be recognized that potentially the tropical Americas could increase rubber production greatly and provide a large exportable surplus. How far they go in developing an exportable surplus will depend upon the ability of American-grown rubber to stand up in competition for the United States market or for markets outside the hemisphere.

Another point to be stressed is this: World rubber consumption in the past few decades has increased rapidly. The curve of consumption, both in the United States and outside the United States, seems likely to continue to rise for a long time. Temporarily, in the United States, consumption is limited by need of conserving available supplies for war and essential civilian use. But probably we are near the low in wartime rubber consumption. Starting in 1944, the curve of both production and consumption may resume its climb. I believe United States consumption of rubber will expand until it doubles, at least, consumption during the peak year of 1941. In that year the United States used around 775,000 tons.

If I am correct in this assumption, the long-term uptrend in rubber consumption will mean the United States eventually will require 1,500,000 tons of rubber annually. That means a billion-dollar industry. What a prize for the chemist and agricultural scientists! Surely this is a prize rivalling the gleam of wealth which drew gold seekers to the Americas hundreds of years ago. Here is an El Dorado worthy of the magic of modern science. It is a story of fortune hunting evolving out of the urgent needs of wartime, in the obscurity of patient research behind the drama of the fighting fronts. Yet, in the long run, this may be one of the most important stories of our time.

Rubber seeds are popped into holes at the nursery and nurtured for 10 to 12 months.

On the news desks, synthetic rubber has out-rated natural rubber in the headlines. This results partly from the controversy over production of synthetic rubber, whether it should be made of grain or oil, whether we should aim for capacity to make a million tons of synthetic rubber or half that amount. While this controversy draws the headlines, millions of young rubber trees grow in the sun of the tropical Americas. These are the vanguards of the new plantation industry, the plantation industry which I believe will be able in the long run to stand the test for survival.

Inter-American Cooperation

In this new plantation industry, inter-American cooperation plays a big role. The Inter-American Institute of Agricultural Sciences, sponsored by the Pan-American Union, with initial funds provided by the Office of Inter-American Affairs, is but one symbol of progress in inter-American cooperation which is making possible the hemisphere rubber-development program. Fifteen of the Latin American countries, together with the United States, are active participants in the inter-American effort to bring rubber back home and to place it upon a solid economic foundation.

The United States Department of Agriculture, in collaboration with the tropical Americas, is carrying on research for the improvement of plant materials and for commercial stimulation of existing strains resistant to leaf blight as well as high-yielding strains. In the 100 cooperative nurseries established in the other Americas, nearly 30,000,000 budded trees already have been produced. These are material for the plantation industry. Five experiment stations strategically located are making available scientific research and guidance for development of plantations, small and large. The Institute of Agricultural Sciences is preparing to take an active hand in this program, in collaboration with experiment stations of the other Americas.

Dr. E. W. Brandes in charge of the Special Rubber project of the United States Department of Agriculture, had done a remarkably speedy and thorough job in field studies for this development. Now the essential plant material, consisting of Hevea rubber trees of high yields and disease-resistant strains from the Orient, developed in the tropical Americas, is available for further expansion of a natural rubber industry.

The most important of the cooperative field stations is located at Turrialba, near San Jose, the capital of Costa Rica. This station, started in 1940, is fully equipped and stocked. It possesses ample land for nurseries, clone collections and other limited plantings. Turrialba was selected as the site because it is ideal for investigation of the most serious pest of the rubber tree in this hemisphere — the South American leaf blight. The volcanic soil is excellent for growing rubber. Moreover, it is well situated to collaborate with the Inter-American Institute of Agricultural Sciences in future research and development work.

The government of Costa Rica has provided a thousand hectare experiment station, known as "Los Diemantes," near Guapiles, about 50 miles from Turrialba.

This farm is less than 1,000 feet above sea level and is representative of the broad northern coastal plain, which is well adapted for rubber growing. It will serve primarily as a propagation garden to supply bud wood to growers in regions infected by the leaf blight.

Another important cooperative field laboratory is at Belem, Brazil, gateway to the Amazon rubber country. This laboratory is located at the Instituto Agronomico do Norte, operated by the Brazilian Department of Agriculture. Considering its strategic position, the Belem center may have a key role in the development of rubber production in the Amazon basin. Studies will be carried on there in different kinds of Hevea rubber indigenous to the Amazon country. Scientists will collect bud wood and seeds of superior trees. Up-river stations will be established to carry on agronomic research. Improvement in tapping methods and preparation of rubber from wild trees immediately are receiving special attention in view of the need of rubber for war purposes.

In Haiti, a cooperative field station has been established at Marfranc for propagation of planting material. This material will be available for distribution locally and to nearby countries. The leaf blight has not been found in Haiti. Strains of Hevea rubber susceptible to leaf blight will be crossed with resistant selections from the jungles of South America at the Marfranc station.

The cooperative field station at Tela, Honduras, is located at the famous Lancetilla Farm, research station of the United Fruit Company. Two plantations of mature seeding rubber trees planted in 1926 by the United Fruit Company are sources of seed used for root stock production. In addition, the latest of these mature trees is used in developing techniques for small-scale or family size rubber enterprises.

In Mexico, cooperative projects are under way with the Ministry of Agriculture at the El Palmar experiment station near the city of Tezonapa, state of Vera Cruz. Some 300 acres of mature rubber trees near this station provide ample seeds for production of root stocks and are under investigation for superior clones. Some of the latter, following blight-resistant tests at Turrialba, may prove valuable for commercial planting.

Rubber for Specific Purposes

In former times, when there was no competition to force rubber growers to develop special products for specific uses, the latex yield from all types of clones and rubber trees went to make up a conglomerate mass. This yielded a general or all-purpose product which had to serve wherever rubber was required. This all-purpose product, of course, had many shortcomings. In the last three or four years before Java and Sumatra fell to the Japs, the Dutch were beginning to make great strides in developing natural rubber for specific purposes. They had found that latex from different rubber trees, and particularly different strains, varies greatly in its properties and that it was of value to keep the latex produced from different strains of trees separate for use where best adapted.

For years chemists have stressed the fact that some synthetic rubbers are resistant to oil and gasoline. Such resistant qualities can be utilized only in such limited ways as in the manufacture of hose for filling stations and by no means affect the shortcomings of these synthetic rubbers. To my mind, in these times only such qualities as can be utilized in making tires are worth emphasizing.

In the new tapping method only a little of the bark is shaved with a jebong knife.

Chemists advocating synthetic rubber on the basis that it has tremendous possibilities in developing products for specific uses, apparently lose sight of the fact that Nature is far ahead of them in the ability to produce different kinds of rubber adapted to specific uses. It is due largely to the fact that producers of natural rubber, particularly in this hemisphere, are not organized, that their product does not receive the wide and favorable publicity which is accorded synthetic rubber.

As regards price, of course, there is no comparison between the two products—natural rubber is much the cheaper. Even if the raw material were to cost nothing, it seems illogical to expect that synthetic rubber could be polymerized out of either alcohol or petroleum in a city factory, paying high taxes and wages, overhead, etc.; at a price comparable to that involved in the production of natural rubber, which is an ideal small-family industry. It is to the interest of rubber consumers in this country to see that the rubber of the future comes from a really cheap source. In the future, it should be possible with fully mature plantations of high-yielding trees to produce rubber at 10 cents a pound or less.

As indicated above, rubber production is an ideal small-family industry. The Goodyear Rubber Plantations Company, which has carried on experiments with tropical American rubber production since 1935, has emphasized that in the development of rubber production in this hemisphere small plantings can play an important role. Although there are some large plantings, like those of Goodyear in Costa Rica and Ford in Brazil, in the future local farmers in those countries will be encouraged to make small plantings of a few acres and of planting material.

No tropical crop is more suitable for farm production than is rubber. The mature trees are tapped and the latex is converted into dry rubber, usually smoked sheets, by a simple process which may be carried out with an investment in equipment of as little as $50.00. The equipment required consists of such materials as

discarded oil drums, homemade wooden paddles, and crude smokehouses built with local materials.

In the Far East over half the rubber is produced on individually-owned farms of less than 100 acres each. To bring these farms into production the grower must wait from 5 to 8 years before the trees are tapped and bring him a cash return.

The effectiveness of the family-operated farm in rubber production has been amply demonstrated in Haiti in connection with the Haitian-American Agricultural Development Corporation, or SHADA, as it is popularly known there. Thomas A. Fennell, president of that corporation, has pointed out that his organization in no way desires to alter the present pattern of land ownership in Haiti, which is essentially a country of small peasant-owned farms. There, women work on farms just as men do. Whole families clear and till the land, harvest the crops, and transport them to market. That system is the foundation of the whole Haitian way of living, and any program that would tend to alter it would be doing Haiti a disservice. Small holders are demonstrating that not only can they cultivate rubber but can produce it against competition.

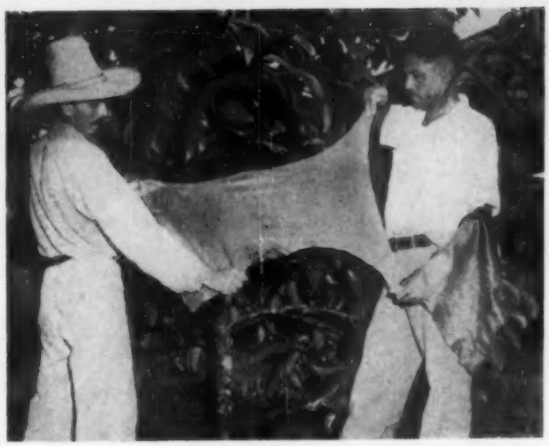
The good wages which rubber production brings the small family unit, providing them a cash income to supplement the living they get off their place, helps to develop contented rural populations. Contented rural populations will undoubtedly mean much more to the future of this hemisphere than some synthetic rubber factories run under high-tariff protection.

Comment on the Price Angle

Actual prices for synthetic rubber, taking into consideration the contemplated large-scale production and the benefits to be expected from research during the next few years, will be around 30 cents a pound for synthetic rubber from petroleum and about 40 cents for the same product from grain.

Vice President Wallace, in an article that received widespread attention ("Against a New 'Isolationism'," in the *New York Times Magazine*, July 12, 1942) said: "Looking ahead to the new time of peace, the motorists of the United States will not only want to have an assured source of rubber, but they will want to get that rubber as cheaply as possible. In the matter of cost, natural rubber from either the Far East or the Western Hemisphere is likely to have a big advantage over synthetic. And, even if synthetic rubber is available in large quantities at a low price, a substantial amount of natural rubber will still be needed for mixing with the synthetic product.

"Few automobile users in the United States realize that the technology of producing rubber from trees is changing almost as rapidly as the technology of producing synthetic rubber. During the last 10 years, higher-yielding strains of rubber have been developed. Some of those strains yield two, three, four and even five times as much as the old-fashioned strains customarily used in the Far East. With modern strains of the Hevea rubber plants, there is every reason to believe that during the period after the war rubber can be profitably laid down in New York City from either South America or the East Indies at less than 10 cents a pound. Therefore, to protect synthetic rubber produced in the United States from destructive competition would require a tariff of at least 10 cents a pound and probably 20 cents."



Workers on a Honduras plantation are seen stretching a finished rubber sheet.

In this discussion, so far, I have dealt exclusively with Hevea rubber in referring to the natural product. Hevea is preeminently the most important species for commercial rubber production, but there are other kinds which offer great possibilities, not only from the standpoint of low cost of production under proper conditions but specific qualities. In certain areas in Mexico and Central America conditions are more favorable to the growing of Castilla than Hevea rubber. In those areas, however, as in the West Indies, the cryptostegia plant, a source of high-quality rubber, appears to offer emergency possibilities.

Cryptostegia rubber under present conditions might cost as much as 76 cents per pound. Indications are, however, that with continued research and experience in growing it, it may be possible to bring its cost per pound down to that of Hevea rubber. Under ordinary growing conditions it will produce only 400 to 800 pounds of rubber per acre. Under the most favorable conditions, that is, with fertile soil and high rainfall, it is a potential source of more rubber per acre than any other rubber plant known. It is believed possible with proper horticultural practices to stimulate its fast-growing young water shoots of branches to yield over a ton of rubber to the acre.

At present there are many unknown quantities in the production of cryptostegia rubber. Good techniques for it can not be worked out until large scale plantings which are just being made are in production. As yet not even the important operation of tapping has been completely worked out for cryptostegia. In areas where labor is plentiful it may be found practicable to cut the young shoots of the cryptostegia vine so as to have the latex drain into cups as in tapping operations with Hevea or Castilla rubber. It appears more probable, however, that the mature vines will be cut and gathered by some mechanical means and the latex extracted chemically.

Just what the chief source of our rubber will be 10 years from now no one can say with certainty. All signs, however, point to natural rubber as the product on which we shall rely mainly in the tremendously expanded industry of the future. Natural rubber has served our needs well in the past and there is every indication that it will continue to do so in an increasingly satisfactory way as time goes on.

Molding Polyvinyl Alcohol

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Wilmington, Delaware

PLASTICIZED polyvinyl alcohol (PVA) can be molded into tough, elastic, rubber-like articles with outstanding resistance to the action of solvents, oxygen, light, heat, and vibration. By varying the grade of PVA and the type and amount of plasticizer, it is possible to prepare a wide range of compositions suitable for molding or extrusion in conventional rubber and plastics equipment. Polyvinyl alcohol resins are unaffected by oils, fats, greases, and other common organic solvents such as alcohols, esters, ethers, ketones, and both aliphatic and aromatic hydrocarbons. Hence, by selection of suitable plasticizers, molded products may be produced which are highly resistant to these solvents. Articles molded from polyvinyl alcohol are not recommended where a high degree of water resistance is required, because on prolonged exposure they soften, swell, and lose strength.

PVA is available commercially in the following grades:

Partially Hydrolized Type		*Completely Hydrolyzed Type*
RH-623	low viscosity	RH-393
RH-428, RH-488	medium viscosity	RH-349
RH-491, RH-403, RH-611	high viscosity	RH-391

Polyvinyl alcohols of the completely hydrolyzed type may be chosen for some special uses, particularly when a reduction in water sensitivity is desired, but for most molding applications polyvinyl alcohols of the partially hydrolyzed type are preferred because of greater compatibility with the plasticizers in general use at the present time. High viscosity polyvinyl alcohols are preferred to the low viscosity grades because of greater tensile strength and superiority in other physical characteristics. The hardness of PVA moldings containing a given proportion of plasticizer varies with the degree of hydrolysis of the PVA used. For example, the following grades increase in hardness in the order listed: RH-611, RH-491, RH-403, RH-428, and RH-391. For soft, highly plasticized molding compositions, RH-611 and RH-491 are recommended. With these grades of polyvinyl alcohol, any durometer hardness between 10 and 100 can be obtained by varying the type and amount of plasticizer used.

Plasticizers

In general, polar organic liquids are more compatible with polyvinyl alcohol than non-polar solvents. The presence of long, unsubstituted hydrocarbon chains prevents organic liquids from showing compatibility and plasticizing action with PVA. Compatibility with polyvinyl alcohol is promoted by the presence of hydroxyl, amino, carboxyl, methoxy, and amide groups. The best softening action is observed in plasticizers such as glycerol and ethanol acetamide which contain hydroxyl or amide groups. A number of amines and amine salts are compatible with PVA but they exhibit little softening action unless hydroxyl groups are present as, for example, in ethanolamine hydrochloride and ethanolamine acetate. Methyl and ethyl ether groups present in polyglycols appear to contribute to the softness and elasticity of polyvinyl alcohol molded articles containing these plasticizers.

Glycerin is the most widely used of the above-mentioned liquids because it is a good plasticizer and is produced in large quantities at low cost. It is compatible in substantial quantities with both partially and completely hydrolyzed types of PVA, is practically colorless and odorless, and is non-toxic. It has good stability, high resistance to solvents, and high softening effect per unit weight. The principal disadvantages of glycerin are its water extractability and tendency to absorb water and "sweat" in humid atmospheres when large amounts are used with completely hydrolyzed types of PVA.

Triethylene glycol, tetraethylene glycol, and hexa-

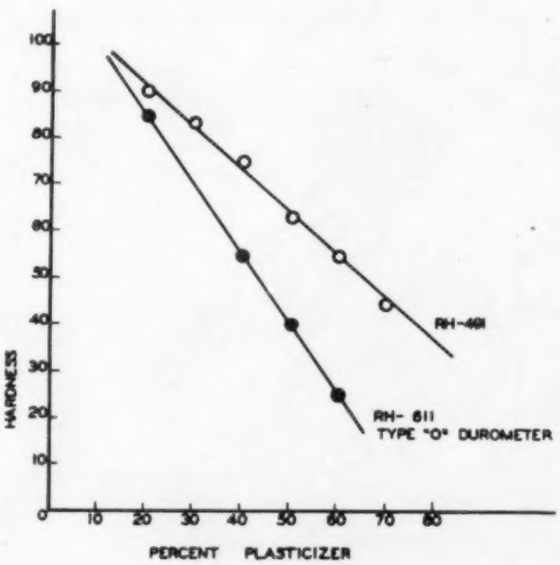


FIG. 1—Triethylene Glycol-PVA Compositions.

EDITOR'S NOTE: The data in the above article is based on preliminary information. Further research and development work is in progress, and additional data will be supplied as soon as it is available.

ethylene glycol are available in commercial quantities and are effective plasticizers for polyvinyl alcohol. These polyglycols are particularly recommended when extremely soft resilient compositions, such as are required in the manufacture of printing rollers, are desired. With RH-611, a Shore durometer hardness as low as 10 may be obtained.

Ethanol acetamide and ethanol formamide have been used in the laboratory and on a semi-commercial scale to produce plasticized polyvinyl alcohol moldings with excellent properties but these plasticizers are not commercially available at the present time.

Most plasticizers for polyvinyl alcohol are hygroscopic and absorb water from the atmosphere. Water is very effective in imparting softness and elasticity to polyvinyl alcohol, but is too readily volatilized to be of practical value as a plasticizer. The presence of water in compositions for compression molding is objectionable because it promotes the formation of bubbles.

Substantial quantities of water-immiscible plasticizers, such as triacetin and methyl phthalyl ethyl glycolate, can be incorporated with a high saponification number, partially hydrolyzed type of PVA such as RH-611, although they are not compatible with the completely hydrolyzed grades of PVA. Most of the common ester type plasticizers such as dibutyl phthalate and tricresyl phosphate are compatible only to a small extent with any of the grades of PVA.

The curves in Figures I through IV show the durometer hardness which may be obtained with various combinations of polyvinyl alcohols and plasticizers.

Preparation of Molding Compositions

The most suitable apparatus for use in mixing polyvinyl alcohol with plasticizers is a sigma-blade mixer, but any moderately powerful slow speed mixer can be used. After the resin has absorbed the plasticizer, the distribution of the liquid through the solid can be completed by milling on rolls. Ordinarily it is not advisable to add plasticizer to the PVA on the rolls because of

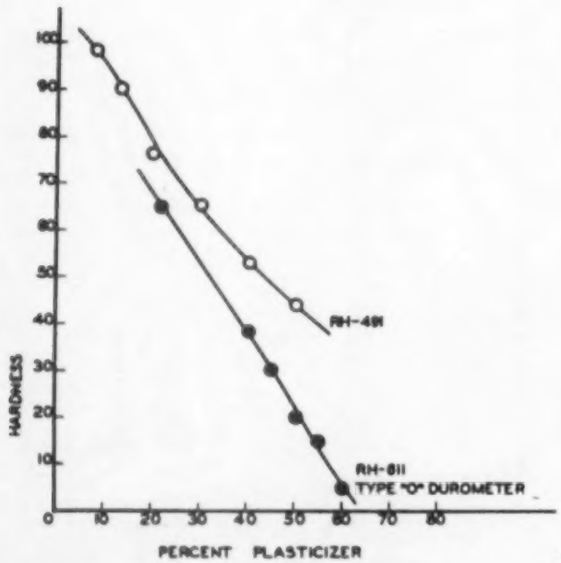


FIG. 2—Ethanol Acetamide-PVA Compositions.

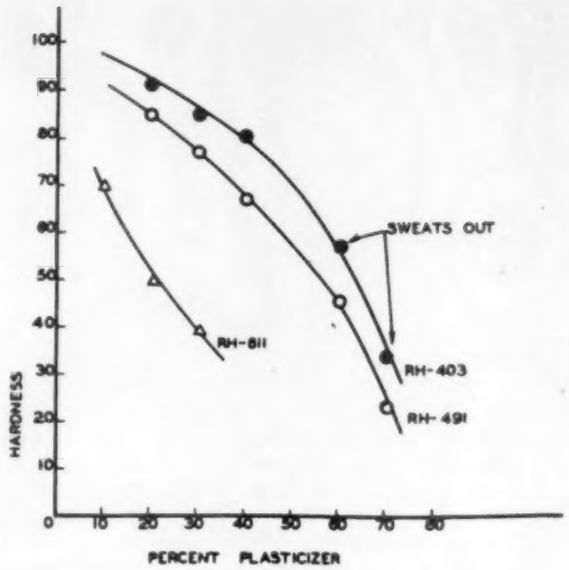


FIG. 3—Ethanol Formamide-PVA Compositions.

the tendency of a liquid to lubricate the composition and prevent its sheeting out. Since polyvinyl alcohol does not lose its "nerve" during milling unless very highly plasticized, milled sheets of plasticized PVA ordinarily have a rough, crepe-like surface.

The partially hydrolyzed grade of PVA, RH-611, is supplied in the form of large granules. In order to incorporate plasticizers, these lumps must first be swollen with a solvent such as methanol. This is preferably done in a closed heavy-duty, sigma-blade type mixer, under reflux, at the boiling temperature of the solvent. After the resin is thoroughly swollen, the plasticizer is added and the solvent distilled off. The product is obtained in the form of large rubbery chunks.

If a free-flowing molding powder is desired a grade of PVA available in powder form, such as RH-491, should be chosen. The PVA is placed in a mixer and the desired amount of plasticizer is added rapidly while the mixer is in motion. Thorough mixing is essential to form a product of uniform composition. The plasticized material at first passes through a somewhat dough-like stage but with continued mixing the plasticizer becomes more uniformly distributed and a free-flowing molding powder is formed. Cooling both plasticizer and PVA aids in obtaining a fine grained free-flowing powder but increases the length of time required for the plasticizer to distribute itself throughout the mass. Conversely, heating during mixing shortens the time required for thorough plasticization and increases the tendency of the particles to clump together.

The time required to complete the mixing operation varies from one-half to three hours, depending on the amount of plasticizer, speed of mixing, and temperature. To complete plasticizer distribution, the powder should be allowed to stand for at least one day, and preferably for a week or more. The addition of a filler such as carbon black promotes even distribution of plasticizers.

Scraps, flashings, and imperfect moldings may be remolded as often as desired so there need be no waste in molding PVA. Almost any of the ordinary

fillers for rubber and synthetics may be incorporated in polyvinyl alcohol mixtures. Gas blacks, for example, can be used in amounts up to 50% but it may be necessary to reduce the proportion when harder varieties of carbon black are used.

The addition of a thermosetting resin such as dimethylol urea to PVA molding compositions is sometimes advantageous where it is desired to reproduce detail, for instance, in the preparation of printing plates. Thermosetting resins cause the molding composition to "set up" so that it can be removed from the mold while warm without distortion. Ordinary 5 to 20% of dimethylol urea is used, together with a small amount of ammonium chloride or other acid catalyst.

Almost any mold suitable for molding rubber and other plastics can be used for molding PVA, but the positive pressure type produces the best results and is necessary for large or intricate pieces. Plasticized PVA powder or milled sheets can be molded at a temperature of 80 to 160°C. (176 to 320°F.) under a pressure of 250 to 1,000 pounds per square inch. Most compositions are molded at a temperature of 125 to 145°C. (257 to 293°F.). Temperature is the most important factor in molding procedure and should be controlled as closely as possible. Blisters may be caused by overheating or by the presence of low-boiling materials in polyvinyl alcohol molding compositions. Since most polyvinyl alcohol plasticizers are hygroscopic, it is advisable to protect plasticized PVA from absorption of water from the atmosphere during storage before molding.

Heating time for molding depends on temperature, pressure and amount of plasticizer used. It is not necessary to "cure" polyvinyl alcohol; the heating portion of the molding cycle need be only long enough to make certain that the interior of the molding is up to temperature. It is desirable to cool polyvinyl alcohol moldings under pressure before removing from the press and for this reason molds of low heat capacity are desirable. Obviously the shortest molding cycle is obtained when the molds themselves are cored for heating and cooling with steam and water. Under optimum conditions, satisfactory compression moldings have been obtained with a complete heating and cooling cycle of six minutes.

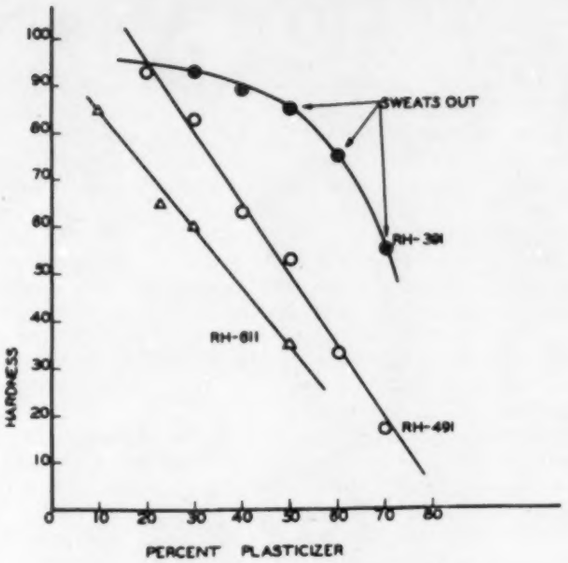


FIG. 4—Glycerol-PVA Compositions.

PVA ordinarily shows little tendency to stick to the mold. If a lubricant should prove desirable, lard oil, stearic acid, or paraffin oil may be used.

Unmodified polyvinyl alcohol is non-toxic, and non-irritating to the normal skin. The possible toxicity of plasticizers or other modifying agents which may be incorporated in PVA moldings should, of course, be considered before use. Since PVA acts as a foreign body in the lungs, care should be taken to avoid inhaling the powder.

A Suggested Vulcanizing Combination For GR-I

THE following base compound was developed in the laboratory of the Acushnet Process Company by Mr. P. T. Gidley. Application for patent is being made by Acushnet but Mr. P. E. Young, president of that company, has kindly agreed to make this disclosure available for the duration. The formula is herewith passed on to the entire rubber industry:

Base Compound

GR-I	100.
Stearic Acid	1.
Paraffin	1.
Zinc Oxide	5.
Sulfur	1.5
Thiurad, Methyl Tuads, Thiuram M or Tuex	1.
Selenac	1.5
Red Lead	0.5
	111.5

Laboratory press cure:—7-12 Min. at 340-320° F.

Paraffin is added primarily to improve the release of butyl compounds from molds. The use of a mold lubricant with butyl rubber is undesirable for the reason that such materials not infrequently cause blistering and/or flow cracking.

The two organic accelerators used together as specified give a faster cure and better tensile properties than when either one is used alone in any proportion. The advantages of this vulcanizing combination are stated to be:

1. The plasticizing effect of the Selenac with zinc oxide in milling.
2. Freedom from scorching.
3. Ease of dispersion.
4. Storage stability of the uncured stock.
5. Freedom from stiffening during natural or accelerated aging.
6. Good tear resistance.

The addition of the red lead is stated to increase the modulus substantially and also to shorten cure.

Any desired filler may be added to this base compound. Carbon blacks are preferred for highest quality.

Office of the Rubber Director

Measuring the Hardness of Rubber

TWO recent developments have focused attention on the importance of the time factor in using the Shore Durometer for measuring the hardness of rubber. On the one hand, most of the synthetic rubbers now coming into large scale use exhibit considerably more creep than natural rubber, and this creep greatly increases the probability of obtaining large variations in the Durometer reading when the test is made by present methods. On the other hand, the Durometer reading has been made a requirement of many purchase specifications so that, whereas it was once regarded as an approximate measurement, it has now become a basis for the acceptance or rejection of large deliveries of rubber goods.

A paper describing tests made at the National Bureau of Standards, in Washington, D. C., to show the effect of time on the Durometer readings was presented at the 46th Annual Meeting of the American Society for Testing Materials last June by Rolla H. Taylor. In this investigation the personal equation was eliminated by the use of mechanical means for applying the Durometer. Motion pictures of the instrument and a stop watch in the same field of view made possible a detailed study of the change in Durometer reading with time. Tests were made on 16 specimens representing 5 different types of synthetic rubber and two kinds of natural rubber designed to cover the range of hardness for which the Shore Durometer is commonly used.

General Form of Curve

Curves drawn to represent the Durometer readings as a function of time all exhibit a rapid decrease of the reading during the first few seconds with progressively less change for succeeding time intervals. The general form of the curve is the same for all compositions but the amount of the decrease varies considerably and is in general much greater for synthetic than for natural rubber.

While these curves indicate the magnitude of the creep, they do not lend themselves well to evaluating the creep quantitatively. If, however, the Durometer readings are plotted against the logarithm of the time, curves are obtained which approximate straight lines, and their slopes may be taken as a measure of creep. These slopes can also be determined approximately from readings at two time intervals, for instance, 3 and 30 seconds or 5 and 50 seconds.

Measurements were made at three different temperatures, and it was found that some specimens, particularly those from synthetic rubber, exhibited a sufficient change to require a specification of the temperature.

Recommended Procedure

The following procedure was recommended when making hardness measurements with the Durometer:

1. Hold the Durometer in the recommended manner in the right hand with the indentor just touching the specimen and with the right wrist or forearm resting on the specimen or its support. Hold a watch in the left hand.

2. Make several trial applications to determine the minimum force required to seat the Durometer on the specimen.

3. At the desired time apply the Durometer as quickly as possible with the minimum required pressure; be careful to maintain constant pressure throughout the test and to hold the Durometer motionless.

4. Take the reading 30 ± 1 second after the application of the Durometer.

Rubber-Cementing Process Speeds War Production

VITAL in the manufacture of gunpowder and many other war materials, the production of hydrochloric acid at a large chemical plant was recently speeded by a rubber-cementing process developed by the Goodyear Tire & Rubber Co., of Akron, Ohio. The process was used in lining a group of steel tanks, each 15 feet and 11 inches in diameter and 18 feet, 6 inches high. With their flat covers, they required about 1850 pounds of rubber compound each. The job represented one of the largest field tasks of this kind ever undertaken.

To meet necessary standards before the linings were applied, each tank's interior was shot-blasted with steel grit. Then each tank interior received two coats of cement, one a primer and the other being the application coat. In the curing process, the customary steam-under-pressure method was dispensed with and special Goodyear-developed chemical compounds were utilized to achieve the same results.

After the application of the two coats of cement to the tank interiors, rubber for the linings was cut, hand-tailored, scived and set in place, after which it was painted with a carbon bi-sulphide solution. The next step was covering the tank's top, after which steam was applied without pressure for four hours to speed up the compound's reaction. Following this step, the interior was again painted with the carbon bi-sulphide solution.

Testing of the tanks before final acceptance by the chemical company was done electrically. As the lining of each tank was completed, an electric wire brush, or electrode, with a 15,000-volt potential, was taken inside the tank. As this brush moved up and down and across the rubber-lined interior, sparks would appear if it grounded against the tank's steel exterior. Because of the size of the tanks and their number, a special crew of Goodyear experts were sent to the plant and the entire operation was accomplished in the field. The crew was under the constant supervision of a Goodyear compounder and the foreman of Goodyear's tank-lining department. The entire job took slightly more than a month.

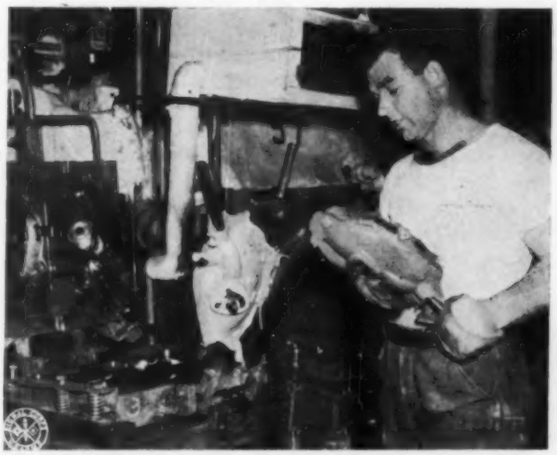
Acushnet Process Company's Role in the Production of Gas Masks

THE history of the Acushnet Process Company, of New Bedford, Massachusetts, closely parallels the growth and advancement of the Chemical Warfare Service. This energetic manufacturer of golf balls and rubber products has worked hand in hand with Army Service Forces, to the point where the Chemical Warfare Service now has the best and most efficient gas mask in the world for protecting the individual soldier from attack by poison gas.

Organized in 1910, the Acushnet Process Company entered the business of processing rubber-like materials for consumption by rubber manufacturers. Removing the resin from or deresinating Mexican guayule, a material of the rubber family, the company's beginning was on a small scale indeed. Land and a small two-story building, twenty feet wide and seventy feet long, were purchased on the east bank of the Acushnet River. An old shed, found on the back of the lot, fitted into the layout as office building and shipping room.

The dispute between the United States and Mexico in 1916 cut off the supply of guayule so the company turned to the deresination of Pontianak, a substance yielding about seven per cent of a fair grade of rubber, the balance being water, dirt, and resin. The price of rubber at this time began to fall and Acushnet Process embarked on a method of reclaiming uncured frictions, mixtures of rubber and fabrics coming largely from the scrap ends of tire manufacturers.

This last method was advanced, and proved valuable during the last World War. Improvements followed, and after the introduction of the warm acid process, Acushnet Process became for a number of years the largest reclaimer of uncured frictions in the country. Material was handled from all parts of the United States and Canada.



Stripping faceblank of gas mask from two-cavity Universal M-3 service mold at the Acushnet Process plant.

Bellevue Avenue plant of the Acushnet Process Co. in New Bedford, Mass. All photographs by U. S. Army Signal Corps.

The price of rubber continued to recede through all these years, and foreseeing the eventual collapse of the friction reclaiming business, the Acushnet Process management opened a small molded rubber goods plant. Starting on bathing caps, water bottles, and toys, this plant grew to be the major unit of the company. The reclaiming of uncured friction was entirely abandoned in 1930 as unprofitable. In 1932 the Acushnet Process Company started in the manufacture and sale of golf balls and this business grew with leaps and bounds until the United States entered the war.

The initial relationship between the Acushnet Process Company and the Chemical Warfare Service began in 1936 with the manufacture of an improved type of stockinetted hose tube which drew the attention of General Walter C. Baker, then Chief of the Chemical Warfare Service. This was, in fact, a challenge to Philip E. Young, president of Acushnet Process, and thus began an association that the Chemical Warfare Service has long been proud to acknowledge.

Working in a shop that he had built in his home, Mr. Young, a graduate of Massachusetts Institute of Technology, made a pattern of a mold which revolutionized the manufacture of gas masks by applying a principle that the company had first used in 1923 for the production of rubber bathing caps. He fabricated a mold, and the result was the first successfully fully-molded facepiece. Acushnet Process then proceeded, through orders from Edgewood Arsenal, to manufacture five thousand plunger type molded facepieces for the first universal type of gas mask. Further changing the face-

piece to a collapsed form so that when opened it hugged the face, accomplished most satisfactory results.

The development of a new Acushnet Outlet Valve followed which was patented and turned over to the Chemical Warfare Service, and since that time Acushnet Process has worked with the Technical Division of the Chemical Warfare Service on new developments and methods of manufacture. During the years 1936 to 1940 Acushnet made practically all the rubber component parts for gas masks that were then in large scale manufacture. The company has developed a method for properly repairing damaged Chemical Warfare Service rubber components in such a manner that the repaired components have been acceptable. Acushnet has given this information direct to the Chemical Warfare Service and to other manufacturers producing Chemical Warfare Service merchandise to assist them in conserving and repairing damaged parts.

Acushnet also has submitted designs and suggestions on simplified testing equipment for valve leakage and resistance and has given models of this type of equipment to the Chemical Warfare Service. It has also developed and produced a simplified emergency type machine for testing leakage in eye sections in non-combatant gas masks.

The splendid record that the Acushnet Process Company has made in its efforts to aid the Army Service Forces has not gone unnoticed. Letters of commendation and praise from Brigadier General Paul X. English, Chief of the Industrial Division of the Chemical Warfare Service, and Colonel Sterling E. Whitesides, Commanding Officer of the Boston Chemical Warfare Procurement District, are the proud possessions of the company.

November 24, 1942, was a proud day for the employees of Acushnet Process Company, for on that day they were honored with the Army-Navy "E" Award for their excellent work in production. The ceremony was attended by such dignitaries as Brigadier Paul X. English, Colonel Sterling E. Whitesides, Chemical Warfare Service, and Captain Gordon C. Hall of the United States Naval Reserve Supply Corps.

Manufacturing gas mask facepieces, hose tubes and valves, aviators' protective equipment of various types,

The hosetubes are cured in special 18-inch M-3 molds. Here the girls are removing the hosetubes from the mold.

Hosetubes are carefully tested in specially-constructed water testers for leaks and other possible defects.

military dust respirator bodies, valves, goggles, miscellaneous and synthetic rubber airplane and tank parts are just a few of the many products made by Acushnet Process. Active direction of the work is in the hands of E. A. Norris, factory superintendent, who in turn works under the direct supervision of T. W. Casey, vice-president. The Chemical Warfare Service Inspection Staff now on duty at the plant is under the administration of Lieutenant A. L. Gursha.

Excellent production is not the only weapon the thousand or more employees use to beat our enemies. They are buying War Savings Bonds in excess of the ten per cent pledge they have made and have already given up many fellow members to the armed forces.

Paint Marker for Cold Surfaces

A NEW paint stick marker for use on all cold surfaces was recently announced by the Markal Co., 6 East Lake St., Chicago, Ill. Designated as Markal "N", the new marker is said to make a wider, more legible mark than other Markal paint sticks. Although originally developed for use in shipyards, steel mills, railroad shops, foundries, etc., it has wide applicability elsewhere.

Markal "N" is real paint in stick form and, according to its manufacturer, produces permanent, fade-proof, weatherproof markings on rubber, plastics, cellophane, metal, lumber, stone, marble, porcelain, and other surfaces. It is particularly suitable for layout purposes on steel plates, whether bare or coated. The marks dry thoroughly in about ten minutes, after which surfaces may be walked on without effacing the marks.

The new paint stick is made in red, white, blue, green, yellow and black; thus, each color may be used for easy identification purposes as well as for piece work marking. Paint sticks for use on hot surfaces are also available.

Buy that extra bond today!

NUMBER **SEVEN** OF A SERIES OF ARTICLES ON

Better Management for the Rubber Factory

VII—MORE TAXES

By ARTHUR ROBERTS

THE current tax payment Act of 1943, popularly called the "Pay-as-you-go" income tax law, does not impose new taxes on individuals but provides for the collection of tax on income as earned and designates the proper procedure. The benefits of this Act are limited to individuals, not to estates, trusts or corporations.

Employer Is Temporary Collector

The Act concerns withholdings from wages of employees; hence, the employer becomes a temporary collector for the government and this complicates payroll procedure. Numerous new sections have been added to the Code to cover withholdings and about all we can say that this new Act begets the rubber goods manufacturer is a bigger payroll job. All existing provisions for figuring taxable net income remain the same. The new Act relates solely to the method of payment and collection of tax.

The best counsel we can give in this regard is to have a copy of the law and Circular WT always on hand when making up the payroll. Circular WT gives specific instructions on withholdings. For a while, questions will arise as to whether a certain deduction is correct. In some instances, the law may not specify or be obscure. To help solve these problems, contact the nearest Internal Revenue office or your tax practitioner. The fact that machinery has been created to make previous deductions for Victory Tax, social security, etc., will make the going easier on withholdings.

Unquestionably, this new Act will increase payroll work. We suggest that you buy a payroll form specially prepared for social security, wage and hour, withholding, Victory Tax and other deductions from wages of employees. This form will simplify matters considerably. There are so many deductions from wages today that a special form is a big time-saver. Someday, let's hope, the government will combine all Federal taxes into one, so that just one deduction is necessary from wages and likewise when computing the tax on income.

The new Act does not touch any previous regulation covering an element of business operation, such as depreciation or bad debts. The Revenue Act of 1942, although it enacts the stiffest tax rates in our history, is of more importance to the rubber goods manufacturer because it has liberalized certain older regulations in the Internal Revenue Code and offers tax-saving opportunities.

Under the 1939 revenue bill, the taxpayer was permitted to carry over operating losses for two years. In other words, losses sustained in 1941 were carried over as a deduction from 1942 income, and if the loss was greater than 1942 income, the excess could be carried over to 1943. If the loss is not absorbed by then, you "hold the bag" for the remainder. Since enactment, the carry-over loss provision has been a big help in enabling business people to effect tax economies and now another tax-saving opportunity has been written into the 1942 bill, permitting you to carry back a loss for two years, but not prior to 1941. So, if you experience a loss in 1943, you can carry it back to 1941, a 1944 loss can be carried back to 1942, and so on. If you experienced a loss in 1942, you could not carry it back further than January 1, 1941.

Example of Carry-Over Provisions

These provisions are so important that we detail their operation here. The figures are not necessarily indicative of the profit and loss experiences of rubber factories but do illustrate the operations of carry-over loss provisions very clearly; hence, the reader can readily acquire an understanding of this routine and apply it to his own figures. Suppose you show the following net income and net losses over a period of years:

1941	$ 500 net income
1942	$1,200 net income
1943	$1,400 loss
1944	$1,200 loss
1945	$ 400 net income
1946	$1,500 net income
1947	$1,600 loss

You may carry back the $1,400 loss in 1943 to 1941 but you cannot go back further than that. Deducting

$500 from $1,400 leaves $900 balance, which may be applied to the $1,200 net income you earned in 1942, leaving $300. Now the 1943 loss has been absorbed by the two-year carry-back with $300 of 1942 net income remaining and there is no loss carry-over to 1944 and 1945. But, the $1,200 loss in 1944 may be carried back to clip that $300 overage, leaving $900 still unabsorbed.

To this point, you have been using the carry-back amendment; now you switch to the carry-over provision legalized in the 1939 bill. Carry forward the $900 to 1945 and 1946. Deduct the 1945 income of $400 from $900 leaving a loss balance of $500 still to go, which may be deducted from $1,500 net income in 1946, leaving $1,000 unabsorbed. In 1947 you lose $1,600, which may be carried back to the $1,000, wiping out 1946 net income and leaving 1947 with a loss balance of $600, which may be carried over to 1948 and 1949. Before these provisions were legalized, you took such losses "on the chin," now you can take credit for them.

A taxpayer with the foregoing set-up of figures would have no net income from 1941 to 1947 and would, over these years, pay no tax thereon. Many taxpayers, from now on, will show profit and loss statements that can be adjusted, more or less, in similar manner, to effect tax economies, even though net incomes and net losses differ substantially from the foregoing figures.

It is important that the reader understand the carry-over and carry-back loss provisions, because alone or in combination they offer tax-saving opportunities. Because of the hectic business conditions begotten of these times, because the postwar period may inject much instability into business, the rubber goods manufacturer, like every other business man, will find that his profits peak and dip erratically for the next 5 or more years. Indirectly or directly, all are affected.

Under the carry-over, carry-back amendments, the taxpayer can make the profit-years absorb the loss-years, hence, he will be better able to survive any such instability from a tax standpoint. Were these provisions not now in the Code, more than one taxpayer would get into an unpleasant financial position because he could not meet his tax bill in a profit-year, a loss-year for which he could get no tax deduction having drained too heavily on his resources. So, keep the carry-over, carry-back loss provisions in mind during the war and postwar periods.

Non-Business Expense Deduction

You may now deduct non-business expenses paid or incurred during the taxable year for the production or collection of income, or for the management, conservation or maintenance of property held for the production of income. Heretofore, the courts have held that, although income from non-business activities was taxable, expenses incurred thereby were not deductible. However, do not confuse this amendment with losses suffered in transactions not entered into for profit. For example, if you bought a pleasure car and sold it at a loss, that is not deductible, or if you lose money on the sale of a residence used for your home at the time of the sale. But, if you profit on such a sale, your gain is taxable. The property must have been used for income-producing purposes before and at the time of the sale to get a deduction for loss and that deduction is subject to capital gain and loss limitations.

Depreciation and obsolescence on income-producing property, whether used in business or not, are deductible; in fact, any charges incurred in connection with the earning of taxable income may be deducted now. Non-business debts must be totally worthless before deduction and then are subject to capital loss limitations. Ordinary business debts may be deducted wholly or in part if the taxpayer can prove, with a reasonable degree of certainty, the amount thereof, which is uncollectible.

Treatment of Bad Debt Accounts

Before 1942, if you deducted bad debts in a loss year, not getting a tax benefit thereby, you had to pay a tax on any recoveries in a subsequent year. For this reason, taxpayers were advised not to deduct bad debts in a loss year, but inasmuch as they must make deductions in the year the debts are ascertained worthless, this frequently prevented a tax benefit if the debts had to be written off in a loss year. Now you may exclude from gross income the subsequent recoveries on bad debts written off in loss years providing that these deductions did not, in themselves, create a tax benefit in the form of a net operating loss carry-over.

This amendment does not apply to taxpayers using the reserve method of handling bad debts because here the amount of recoveries is not taken into income as such but merely credited to the reserve account. You still must pay a tax on bad debts recovered if you got a tax benefit in the year of deduction. In other words, you got a tax deduction for the bad debts reported in a previous year, so if you recover some or all the money due you, then you must even things up with Uncle Sam by paying a tax on the recovery.

Deduct all losses of useful value in the taxable year. A careful checkover of your fixed assets may show that you can take substantial deductions for forced obsolescence or other business casualties that are more likely to occur today than in normal times. Many taxpayers have lost out on such deductions in the past because they failed to take them in the designated years. Others have short-changed themselves on depreciation for the same reason. If you fail to take ample depreciation in one year, you can't make it up in a subsequent year.

If depreciable property is disposed of for causes other than depreciation or obsolescence, a deduction for the difference between cost and salvage may be allowed. In some cases, where earnings are short of the depreciation taken, no income tax benefit is obtained. The courts, in the past, have permitted such taxpayers, in some instances, to charge back this expense to the value of the property, thereby enabling them to take a larger deduction in subsequent years.

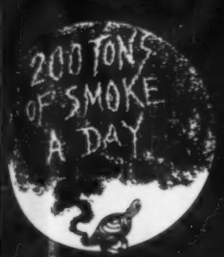
Depreciation is a headache to rubber goods manufacturers. The Internal Revenue Department reports that it is a problem child, too. Because depreciation runs high in this industry, the yearly deduction is substantial and if the estimated wear, tear and obsolescence are too low, the tax paid will be too high. Remember that depreciation is always an estimate at best and, because of the many variables, the management

The **BLACK** *of* **TODAY**

STATEX

A COLUMBIAN COLLOID

GR-S



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should study its depreciation schedules carefully to determine to the best of its ability whether it is getting a maximum deduction. If you did not take ample depreciation under the known facts of previous years, you cannot adjust the shortage later on but you may be permitted the benefit of accelerated depreciation if your mechanical equipment is operating longer hours today.

Discussion of Depreciation

In normal times, depreciation schedules are usually figured on a 8-hour day basis. Obviously, if equipment is now operated 12, 16, or 24 hours a day, it will depreciate faster and should rate a higher deduction. Some plants operating 24 hours daily are writing off their equipment in 5 years. If a machine is not in operation in the taxable year, a deduction may be allowed. If you are able to buy new equipment, be sure you figure the rate high enough from the start. This will save you headaches later on. Use the straight-line method of figuring depreciation, an equal write-off each year, based upon the cost divided by the years of useful service life. This is where many taxpayers go wrong. They base their depreciation schedules on physical life, which is often longer than profitable or useful service life. Then too, the Treasury Department prefers the straight-line method.

Maintenance and repairs offer a tax deduction in normal times but due to the difficulty getting materials and manpower to provide adequate upkeep, the rubber goods manufacturer may have to forego this expense for the duration. This will produce a bigger profit on paper and a tax must be paid on the differential even though the profit is "watered" by the inability to take a deduction through normal upkeep. Executives in this industry have pointed out this apparent inequality, contending that depreciation goes on in war and peace, that if repairs are neglected when needed, they "gang up" and take a relatively bigger toll sooner or later or compel premature replacement. We want to point out that the carry-back provision should take care of this, otherwise, taxpayers would have had to pay higher taxes for the duration and then, when they eventually made the cumulative repairs in the postwar period, the expense might be so great that operations for the year of reconditioning showed a loss with no tax benefit. Now, you can carry back such a loss to the two preceding years.

It is recognized, but not determinable, that at one point taxes become a brake on production and promotional enterprise because management is dulled, extravagance and inefficiency encouraged. Although the borderline at which the various taxes start to destroy business initiative and even enterprise itself is not readily discernible, the rubber manufacturer has one means of keeping that borderline as far away as possible. His taxable base should represent the true net income. High rates are justified to win the war but not the taxing of artificial income. The rubber manufacturer must see that his income, as reported, takes advantage of all legitimate deductions. When income tax rates were low, every dollar deducted meant much less of a saving than today, when rates are sky-high. So, take all the deductions you can get legitimately. The tax-saving opportunities are put in the law to enable you to benefit by them.

Interpretation of the Law

Finally, bear in mind when listing deductions, that in most transactions, there is only one right way, but in certain borderline cases recording depends upon the viewpoint of the taxpayer and this may differ in different concerns. When a transaction may be interpreted in two different ways with equal propriety, use the interpretation in your favor. This is not tax *evasion*. It is tax *avoidance*. There is a big difference. The U. S. Supreme Court has ruled that, "The legal right of the taxpayer to decrease the amount of what otherwise would be his taxes and altogether avoid them, by means which the law permits, cannot be doubted. It is well settled that a taxpayer may resort to any legal methods available to him to depreciate the amount of his tax liability, so long as his efforts are confined to law."

Many income tax laws can be interpreted in more ways than one. The Treasury Department may impose a tax on one taxpayer under one interpretation and tax another under a different ruling. There is no wilful evasion if there is no concealment of material facts. There are lawful means of reducing tax and there is no stigma attached to the taxpayer who follows the tax laws, yet, tries to keep his tax expense down to minimum.

Additional Data on Paracon Rubber

SOME additional data on Paracon, the new polyester rubber recently developed by the Bell Telephone Laboratories, currently being produced by the Resinous Products & Chemical Co., of Philadelphia, which was briefly described in our May, 1943, issue, has been furnished, as follows:

Paracon is a highly molecular weight linear polyester which is soft enough to be rubbery and is capable of undergoing a vulcanization reaction. It is prepared by the condensation of dibasic acids with glycols or by the self-condensation of hydroxy acids. The name is intended to signify "condensation rubber." It differs from other ester rubbers, such as Norepol, Agripol, and Kempol, in the method of vulcanization and in that it is made of relatively pure intermediates of known structure. Hence the condensation may be pushed to a higher degree, with a resulting gain in tensile strength and elongation.

Raw Paracon gums are light-colored, translucent or transparent resins which in appearance resemble milled natural rubber. They can be compounded on rubber mills with many of the common rubber pigments. Some samples can be handled by the usual rubber techniques, and others, depending on the composition, are so sticky that the use of fixed blades is necessary. The manufacturer's recommendations should be followed.

Editorials . . . . . .

Rayon-Cotton Controversy

AS indicated elsewhere in this issue the controversy over whether the production of high-tenacity rayon yarn shall be still further increased to assure sufficient supplies of rayon tire cords in military tires to the exclusion of cotton tire cords has again come to the fore. This is the question over which, it will be remembered, Rubber Director Jeffers first faced an aggressive Senate investigating committee and came off with high honors. It is also the question which gave Mr. Jeffers the reputation of being "tough" and "high-handed" where the rubber program was involved.

The controversy was re-opened by the quietly functioning Senate committee investigating the war production program, popularly known as the Truman Committee. This committee has a well-earned reputation for penetrating deeply into the heart of specific problems and coming up with sincere solutions. It did a splendid job on the rubber situation prior to the formation of the Baruch Rubber Committee and did a good deal to dispense with the confusion which reigned for so many months. The last vestiges of the confusion were swept away by the conciseness of the Baruch report. There is some question, however, as to the clear thinking behind the Truman Committee's report on the rayon-cotton question.

The committee, in its report, charged that the decision of the War Department to specify rayon instead of cotton in medium and heavy duty tires is not based on adequate scientific evidence. These tests, which in the committee's opinion did not treat with the tire cord—rayon or cotton—as the sole variable, are outlined in the report. There is, of course, considerable logic in the argument as to the scientific value of the tests conducted, although tire experts were in agreement as to the final results. But the committee seemed to find something sinister in the fact that the tests were conducted by members and former members of the so-called "Big Four."

Here, we think, is where the Truman Committee veered from its usual straight course. Who else would be better qualified to conduct such tests? Surely it would not be someone in the cotton or rayon business! Or someone unrelated to the tire business! As one of our contemporaries in the rayon field puts it: When one is ill, a doctor is called. Building a bridge usually requires a mechanical engineer. Who should know more about tires and their raw material requirements than a tire builder?

The inference in the statement is that the tire manufacturers have more to gain from the use of rayon in tire cords than from cotton. That is most questionable. Practically all of the larger tire manufacturers have large investments in cotton mills. Goodyear owns its own cotton plantation. Conversion to rayon yarns means added expense. On a dollars-and-cents basis tire manufacturers would probably prefer to continue making tires from cotton cords. It is apparent from the report that the days of sensational charges in the rubber program are not yet over.

Synthetic Advertising

AT the request of the majority of rubber companies in the Dominion, the Canadian rubber authorities have banned the advertising of products made from vulcanizable synthetic rubber. One reason for the action is that synthetic rubber tires, as they come on the Canadian market, will carry no trade names. Although industrial products made of synthetic rubber will carry brand and trade names, they will be made to specific standards under wartime regulations. We do not believe that similar action is necessary in the United States, but perhaps a word of caution is in order to avoid such a step from being taken. Some advertising on synthetic rubber products, particularly tires, is much too flamboyant. The claims made strain the credulity. The maxim about fooling all of the people only some of the time is still with us. Let's get synthetic rubber started off on the right foot.

CURRENT NEWS OF THE MONTH

RAYON-COTTON TIRE CORD CONTROVERSY FLARES UP AGAIN IN OFFICIAL CIRCLES

THE controversy over the adoption of rayon for tire cords for use in military tires, which was the first major problem to face William M. Jeffers when he assumed the role of Rubber Director last year, has flared up again in official circles. On July 16 the special Senate committee investigating the war production program, headed by Senator Harry Truman, of Missouri, more popularly known as the Truman Committee, issued a special report urging that construction of additional facilities for the manufacture of rayon for tire cords be delayed until further tests have disclosed the relative value of cotton and rayon for this purpose. According to the report, "rayon has displayed no superiority (on the basis of tests) over cotton to warrant the great investment in critical materials which is now being made to produce facilities for rayon cord." As near as can be determined, the present authorized program calls for the production of 68,000,000 pounds of rayon for tire cords annually, with an additional 100,000,000 pounds under contemplation.

The Truman Committee criticized what it termed the "War Department predilection for rayon," and declared that "certain officials of the War Department, who have had much to do with these tests, came to the departments from companies which are among those which have for several years advocated the use of rayon cord." It charged that the War Department had made its original decision in favor of rayon cord "without the benefit of any adequate tests or scientific evidence."

Rubber Manufacturers Involved

"The War Department originally relied on opinions primarily of the four big rubber companies, which had been selling rayon cord tires, that rayon would prove superior to cotton cord in synthetic tires," the report said. "This theory first was based chiefly on an argument that cotton would not stand the heat generated in a synthetic rubber tire."

But now the War Department has changed its position, the report continued, and relies primarily on an argument that cotton has "less resistance to bruise-break" in synthetic rubber tires.

The committee said it was "interesting to note" that in tests conducted by the War Department in October and November, 1942, "cotton proved superior to rayon in natural rubber tires for military purposes, according to the testimony of the officer in charge of the tests."

"The War Department conducted extensive tests which were not scientifically set up to determine the comparative merits of cotton and rayon cord. Even on the basis of these tests, however, rayon has displayed no superiority over cotton to warrant the great investment in critical materials which is now being made to produce facilities for rayon cord."

The report was critical of the tire-testing program in the summer of 1942, in which conditions in North Africa were simulated to determine the relative ability of various tires to hold up under the stress and demands of actual warfare. Much attention was paid, it asserted, to how much rubber could be removed safely from the tread of an Army tire, considering the relatively short life of vehicles in battle, and what mixtures of synthetics with crude rubber should be used to insure greatest durability.

Cord Not Sole Variable

During the tests, made at Ordnance Centers at El Centro, Calif., and at Normoyle, Tex., the committee asserted, there were "almost no tests" run in which tire cord was the sole variable between competing tires.

"Tires using different weights of rubber, made by different companies, using different proportions of synthetic and crude rubber, and made at different points in the rapidly-developing art of compounding synthetic rubber, some using natural tubes and some using synthetic tubes," it said, "all were lumped into the tests."

Officers in charge of the tests, the report stated, were Col. B. J. Lemon, formerly of the United States Rubber Company, and Capt. J. J. Robson, formerly of the Firestone Tire and Rubber Company. The actual operating personnel of the Normoyle test fleet, it added, were Firestone employes.

The committee held that the testing grounds did not provide means for adequate tests of the performances of all of the tires on a vehicle. It recommended that a tire testing track which would present equal hazards to all tires be built without delay.

Jeffers and Patterson Firm

When the report was called to the attention of Rubber Director Jeffers his reply was a terse "So what?" He pointed out that experts of the Army, the industry and his own office disagreed with the findings of the committee and stated, "I'll trail along with those men who have had a lifetime of experience with tires and tire-testing, particularly when essential truck and bus transportation, the civilian economy, the outcome of battles, and the lives of soldiers are the price of being too late with too little without an insurance policy."

An immediate reply to the committee report was also issued by Under Secretary of War Robert P. Patterson who stated: "We cannot take chances with the tires on the airplanes, armored cars, artillery guns and trucks that the soldiers are using in battle. These things are the soldiers' lives. They mean the difference between victory and death.

"We will not be satisfied with second best. On this point no compromise can be made and no considerations of economic interest can be entertained. Large, heavy-duty tires with rayon cord are better and safer than with cotton cord. This is especially true of such tires made of synthetic rubber. The Army must use synthetic rubber. There is no choice."

Council Opposes Expansion

On August 9 the National Cotton Council, which has heretofore objected to the adoption of rayon for tire cords, called on the War Production Board to abide by the findings of the Truman Committee. The Council specifically opposed the request now pending before WPB that rayon cord production be expanded for the third time since the outbreak of the war. Two expansion programs previously authorized, it was said, would quadruple the output of rayon tire cord, and the current request would sky-rocket this production to eight times its pre-war capacity.

In a statement addressed to Donald M. Nelson, chairman of WPB, the council's president, Oscar Johnston, said the Truman Committee's investigation clearly showed that the tire tests which the War Department has been making have not proved the superiority of rayon. The

conclusions and recommendations of the committee can be neither denied nor disregarded. Mr. Johnston said, adding that charges of "prejudice" and "partiality" cannot be made against members of the investigating sub-committee since "not a stalk of cotton is grown, nor does the cotton industry operate" in the States represented by them.

Restating the position of the Council in the matter, Mr. Johnston said "we have not asked, nor do we now ask, that cotton be accorded any special or favored consideration. However, we do ask—in fact, we demand—that cotton be given a fair hearing before it is condemned and executed in the tire cord market by the Government of the United States.

"If, under normal, competitive peacetime conditions rayon, through its own resources, was taking a substantial portion of the tire cord market away from cotton by legitimate business practices, cotton would have no complaint against anyone but itself. But this is not the case."

Rayon Industry's Viewpoint

The viewpoint of the rayon industry in the cotton-rayon controversy was summed up in a recent issue of the *Rayon Organon*, an independent publication which reflects the views of that industry, as follows:

"The Truman Committee points out that the comparative tests for the rayon versus cotton tires were carried out by Army personnel formerly connected with the large rubber companies. Yet one is moved to ask who else would be better qualified to conduct such tests. Surely it would not be someone in the cotton or rayon industry, nor would it be, say, a teacher of elocution. When one is ill, a doctor is called. Building a bridge usually requires a mechanical engineer specializing in bridge construction. Who should know more about tires and their raw material requirements than a tire builder?

"The additional fact that the tire companies have large sized investments in cotton tire cord spinning facilities, which are not needed or used in making rayon tire cords, might suggest a bias of the tire manufacturer toward the cotton cords. Yet the way in which the large tire companies and their technical personnel, plus the Rubber Director and the Army, have recommended and put through the conversion of regular rayon to high tenacity rayon for tire cord can only lead to the conclusion that the rayon cords are superior for the particular job to be done.

"It may be added that the rayon companies themselves have converted some of their profitable regular yarn spinning equipment to the production of high tenacity rayon yarn which is often less profitable per pound. This they have been only too glad to do in furtherance of the war effort. But surely, had there been no national emergency and shortage of building materials, the companies would have preferred to build new rayon plants especially designed for the manufacture of the high tenacity yarns. Then they would have had a new and efficient plant instead of a converted plant and they would have been able to preserve their normal civilian yarn business at the same time."

EXPANSION PROGRAM INVOLVING MILLIONS PLANNED FOR RUBBER INDUSTRY

According to reports emanating from Akron, but not officially confirmed by Washington, a $92,000,000 expansion program to provide additional floor space and manufacturing facilities for the output of synthetic rubber tires is under contemplation. The program, according to an industry spokesman, is awaiting Government action on financing and priorities.

Rubber Director Jeffers has set a goal of 30,000,000 all-synthetic tires for essential motorists for 1944. Although the tire industry could produce this number of tires over and above its military commitments if it were using crude rubber, there is some question as to its capability to meet the demand with GR-S, which is more difficult to process. As one tire expert put it, a plant unit with a capacity of 3,000 tires a day when using crude rubber can only turn out 2,100 tires when using the synthetic rubber. This means an approximate 30% loss in production efficiency.

There is considerable conjecture at the moment as to which direction the expansion program, if approved, will take. In some quarters it is believed that Akron factories will be given the bulk of the task of producing the desired all-synthetic tires; in others, it is felt that it will be given to tire plants outside of the Akron area, since the latter area is considered critical from the labor standpoint. A committee representing the URWA has already called on Mr. Jeffers urging that Akron be given the lion's share of the program.

Synthetic Plants 61% Complete

More than 80% of the country's government-financed war plants was completed by the end of June, according to a statement made by Donald Nelson, chairman of WPB, on August 5. The extent of the advance in facilities was illustrated by Mr. Nelson with the statement that the synthetic rubber plant program, which was only 3% finished a year ago, was 61% complete by the end of June.

Release Soybean Oil

It is understood that as a result of the intensive efforts of the Office of the Rubber Director, working closely in conjunction with the War Food Administration, the manufacture of specialty rubber-like materials of the chemurgic type, such as the Norepols, Agripol, Vulprene, Volite and others, the production of which was regulated by the available supply of soybean oil, may now be increased to reasonable limits. These rubber-like materials are capable of replacing crude and reclaimed rubber in the production of food gaskets and other useful end products.

Manufacturers of these specialty rubber-like materials, according to a recent announcement from the Department of Agriculture, should present their requests for allocations of soybean oil to the Fats and Oils Branch of the Imports and Allocations Division, Food Distribution Administration, Washington, D. C. Such information as exact purpose for which the product is to be used, the pounds required for operation during a specific period, type and grade required, period during which quantity applied for will be used, and present inventory of material for which application is made, should be furnished.

Resin Manufacturers Protest

Manufacturers of synthetic resins, many of which have been used in recent months and are still being used to replace rubber in many applications, are considerably concerned over the prospect that they may have to gracefully withdraw from this field as supplies of synthetic rubber grow more plentiful. They are reported to be particularly disturbed over the possibility that the synthetic rubber, in latex or coagulated form, will be provided to processors at a low cost, or at a price considerably below costs of production. The matter is understood to have been discussed by the resin manufacturers and the government agencies involved.

The resin manufacturers point out that under wartime pressure they embarked on costly research programs and with government priority assistance erected new plant capacity to meet the urgent need for rubber replacement. Manufacturers of the vinyl resins, particularly, figured conspicuously in this development. Considerable competition between the resins and various types of rubber is anticipated in the post-war period, and once the government control of prices is eliminated the resin manufacturers believe they can compete on both a price and performance basis.

Elastic Yarn in Prospect

The first indications of a possible early return of elastic yarn for civilian products was seen last month by textile suppliers when WPB announced that it had selected seven hosiery manufacturers to test elastic yarn made from synthetic rubber. Similar group tests, it was believed, may be sought on behalf of such products as corsets, girdles, and other articles which formerly used elastic webbing.

According to the National Association of Hosiery Manufacturers, the seven hosiery producers, each authorized to obtain 100 pounds of elastic yarn made from

synthetic rubber, have undertaken to use the elastic yarn in types of products similar to those in which they had previously used elastic yarn made of natural rubber. These companies also undertake not to advertise the products made from the limited supply of yarn nor to give them any publicity which would attach to the companies.

"Furthermore," the Association said, "the product made by them from the yarn must be subjected to a variety of tests which will serve to clearly show to what extent the yarn made of synthetic rubber proves satisfactory. In order to give the product actual tests, as distinguished from laboratory tests, its distribution in the market is permitted, but on arrangements under which the distributor will secure the reactions and ascertain the experiences of the ultimate users.

"Assuming that these experiments prove that elastic yarn of synthetic rubber is fully satisfactory, the general availability of elastic yarn to our industry and other industries would be speeded considerably, because ample quantities of synthetic rubber are bound to be available long before this is true of natural rubber."

SIMPLIFIED PRICING METHOD FOR GOVERNMENT SALES ESTABLISHED BY OPA

A simplified method for pricing some of the sea rescue balloons, parachute parts and equipment, life rafts, airplane de-icers, and other rubber products sold to the government has been established by OPA. The method, which applies to products which include material the manufacturer has bought from the war procurement agency to which the product is sold, is covered by Amendment No. 2 to MPR 403 (Certain Rubber Commodities Purchased for Government Use), issued on July 24 and effective July 30.

The method facilitates operation under the new form of contract recently adopted to expedite war production. Under such contracts a war procurement agency, such as the War or Navy Department, may provide that the manufacturer shall buy from the agency fabrics to be used in making the commodities to be sold to it. Further to expedite the proceeding, OPA provides that the manufacturer shall use the net price he paid the procurement agency for the material in computing his maximum price for the commodity in which it is used.

Other changes in the amendment broaden coverage of the regulation, and further simplify pricing of products, almost all of which are military. None of the changes has any effect on civilian consumers.

Products added specifically to coverage of the regulation are ammunition case linings, bag liners, eyeshields for gun sights, goggles, sea rescue balloons, waterproof sails, waterproof maps, and industrial life suits. The life suits are rubber garments worn by those who must go under water to repair damage to vessels. Articles previously covered by the regulation include a number such as flying suits, gas and oxygen mask parts, jungle hammocks, ponchos, landing boats, bullet sealing hose and pontoons.

Reduced prices of synthetic rubber have been reflected in maximum prices provided in the regulation, and the new amendment clarifies some of the requirements for computing the changed ceilings. Manufacturers are given credit for voluntary reduction in their prices to reflect decreased prices of synthetic rubber before April 30, when they made such reductions. Manufacturers who do not compound the synthetic or substitute rubber or balata contained in the products they price, are told in detail how to determine the difference in their price to reflect the lowered cost of the material.

One provision gives manufacturers a method for computing a single differential so that several commodities differing in size, style or compounds may be sold at the same price if that has been the manufacturer's practice. Another enables sellers to calculate maximum prices to the nearest fraction of a cent they customarily used in April, 1943, in pricing similar commodities, thus clearing up any possible confusion on that point.

Amendment No. 3 to MPR 403, issued August 7, reduces maximum prices paid by the government for a variety of commodities in which neoprene is used, thus reflecting the lowered cost of the neoprene. The amendment provides that the prices for synthetic and substitute rubber and balata in effect August 1, 1943, must be used in determining the ceilings of commodities containing those materials which are covered by the regulation.

This amendment also provides that repair kits for a list of commodities covered by the regulation shall be covered as well. The kits are for such things as flying and diving suits, life rafts, and inflatable boats.

Rubber Order R-1 Amended

On July 28, WPB issued Amendment No. 2 to Rubber Order R-1 (the overall regulation affecting the use of rubber, synthetic rubber, balata and products thereof), making the following changes:

(a) Inventory certification on purchase orders of resellers of tires and tubes no longer is required on orders originating outside the continental limits of the United States.

(b) Wheelbarrow and lawnmower tires have been removed from the list of prohibited products for both civilian and Government orders, and compounding regulations for their manufacture have been added to List 24, Appendix II.

(c) The "molded wheels and casters" item on the list of permitted civilian order products (Schedule A) has been revised to indicate that both caster wheels and caster tires are included. Compounding regulations for this item also have been added to List 24, Appendix II.

MECHANICAL GOODS

Reductions in the maximum prices of neoprene rubber hose and belting to reflect the decreased cost of neoprene, now set at 27½c a pound for civilian use, were ordered on July 14 by OPA with the issuance of Amendment No. 12 to MPR 149 (Mechanical Rubber Goods). Amounts of the reductions in prices of these products vary with the proportion of neoprene used in their manufacture.

The amendment, effective July 20, set specific consumers' ceiling prices for fuel oil and gasoline hose, oil suction and discharge hose, hydraulic control and industrial grease hose, spray hose for paint, tank car and tank truck hose, and other types. Manufacturers' prices to various other classes of purchasers are determined by deducting for discounts, allowances and other deductions the manufacturer had in effect to the class of purchaser on October 1, 1941.

A method is given for arriving at the ceiling prices of constructions and sizes of the specified hose which are not listed. Manufacturers determine maximum prices for neoprene rubber V-belts and neoprene conveyor belting by deducting from their list prices of October 1, 1941, a specific discount given in the amendment. They then deduct from the resulting figure all discounts, allowances and other deductions they had in effect to a purchaser of the same class on October 1, 1941.

Additional changes were made by the amendment as well, these being:

(1) Standardize the charge that manufacturers may add to the maximum price for the carcass of conveyor, transmission or elevator belting when the belting is produced with a skim coat in addition to the friction coat. This is 10 per cent of the carcass price and is established in line with the industry practice on the base date in charging for those additional thin layers of rubber compound which are included to increase the belt's resistance to strain.

(2) Provide that maximum prices established by the regulation shall be adjusted to the nearest fraction of a cent that the seller customarily used in pricing products in the same line.

(3) Add an adjustable pricing provision to the regulation which is uniform with the standard provision added to other price regulations.

(4) Revise the definitions of "regularly quoted price," "purchaser of the same class," and "standard list item," so that the first mentioned term shall be precisely defined, and so that the other two terms are shown as being applicable to all persons covered by the regulation.

Additional Reductions Made

Additional reductions in the ceiling prices of various mechanical goods con-

taining neoprene, including hose, belting, packing, and similar commodities, as well as molded, extruded and lathe-cut rubber goods bought chiefly by industrial consumers and for the government, were made in Amendment No. 13 to MPR 149, issued by OPA on August 2. All of the reductions reflect the lowered price of neoprene.

In telling how prices of various goods are to be reduced, the amendment provides a method by which manufacturers who maintained differentials in prices to different classes of buyers on either of the base dates in the regulation may continue to use such differentials. (October 1, 1941, is the base date for such products as belting, hose and packing. January 5, 1942, is the base date for most molded, extruded and lathe-cut goods.)

The amendment also gives a formula which manufacturers may use in determining maximum prices so as to continue selling several sizes, styles or compounds of a synthetic rubber article at one price if they have been accustomed to do so.

A provision in relation to maximum prices for hose made of neoprene or Thiokol is amended so that the 10 per cent discount which must be deducted when the hose is sold in standard package lots need be deducted only if the manufacturer gave that discount on October 1, 1941. This change is made because the discount was not given for certain types of hose on October 1, 1941.

The amendment also established consumers' maximum prices for two kinds of neoprene rubber hose which recently have come on the market, namely: gasoline hose of the service station pump type, and molded-braided welding hose. The gasoline hose is priced at 41 cents per foot for three-quarter-inch hose, and 52 cents per foot for one inch hose. The welding hose ceilings range from $13.18 per 100 feet for three-sixteenth inch one braid hose, to $20.22 per 100 feet for three-eighths inch two braid hose.

CERTAIN COMMODITIES

Dollars-and-cents ceiling prices for raincoats made originally for enlisted Army men and members of the WACS but rejected by the government as less than perfect were established by OPA with the issuance of Amendment No. 10 to MPR 220 (Certain Rubber Commodities), issued July 17 and effective July 23. Prices cover all civilian sales except those at retail, the latter being priced under GMPR at present until specific prices are assigned. The maximum prices established are $4.80 to retailers and $4.00 to other distributors for rejected enlisted men's raincoats, and $6.00 to retailers and $5.00 to other distributors for rejected WAC raincoats.

Fabrics which are made in whole or in part of rubber or substitute rubber and which have been rejected by the government are also given ceiling prices. These prices are at the manufacturers' level and are set at 75% of the contract price for the perfect fabric. The "rejects" were formerly priced, where possible, by a formula contained in the regulation, but as few sales of them were made on the base date many had to be priced by special OPA order.

Apparel Prices Reduced

In keeping with the lowered cost of neoprene, ceiling prices for rubber fabrics, apparel and other commodities in which neoprene is used were reduced by OPA in Amendment No. 12 to MPR 220, issued on August 5 and effective August 12. By setting August 1, 1943, prices of synthetic or substitute rubber or balata as those to be used in computing maximum prices, the amendment includes all recent reductions in the price of neoprene. Three other changes are contained in this amendment, as follows:

One gives in greater detail the method which manufacturers who do not compound the synthetic or other substitute rubber contained in their products shall use to determine the reduction required in the maximum prices of the commodities.

Another tells the manufacturer how to calculate the differential in price he is to use in order to continue his practice of selling various sizes, styles or compounds of a synthetic rubber article at the same price.

The third tells sellers to calculate their maximum prices to the nearest fraction of a cent that they customarily used in pricing similar commodities in March, 1943.

CARBON BLACK

Under the terms of Allocation Order M-244 (Furnace Type Carbon Black), which supersedes General Preference Order M-244, manufacturers requiring furnace type carbon black in quantities between 100 pounds and 5,000 pounds in any month are no longer required to obtain direct or specific allocation from WPB. Orders within these amounts may be placed directly with suppliers who, in turn, on the twentieth of each month furnish the Chemicals Division of WPB with a list of orders received. The division will then approve or deny the orders. For amounts of more than 5,000 pounds in any month specific allocation must be made.

The new allocation order specified the primary products for which furnace black may be used, as follows: Crude rubber, latex, whole tire reclaim, all other reclaim, scrap rubber, Buna S, Buna N, butyl rubber, Thiokol and neoprene.

WIRE AND CABLE

Provisions for the individual adjustment of ceiling prices for producers and sellers of wire, cable and cable accessories similar to adjustments recently made available to manufacturers of essential machinery, were announced by OPA on July 29. The action, contained in Amendment No. 4 to RPS 82 (Wire, Cable and Cable Accessories), effective August 4, is confined to cases qualifying under rigid tests of essentiality of the seller and the product.

The tests of essentiality are specifically cited in the amendment, as are various cost, price and competitive data factors which will be considered when applications for adjustments are reviewed. Generally, the new provisions will permit OPA to adjust prices after it has ascertained that ceiling prices are at such a level that supply of vital wire and cable is impeded or threatened, provided that the adjusted price will not cause an increase in the cost of living.

CAMELBACK

Manufacturers' ceiling prices for camelback were extended to grades made of synthetic rubber on July 27 by the issuance of Amendment No. 4 to MPR 131 (Camelback). Ceilings for synthetic rubber camelback are now the same as ceilings for corresponding grades (A, C and F) of camelback made of crude or reclaimed rubber, so that there is no change in prices to consumers. Until recently camelback was made only of crude or reclaimed rubber, but synthetic rubber use was authorized by WPB a few weeks ago.

RUBBER HEELS

Corded rubber men's half heels, which have come onto the market only recently although corded whole heels for both men and boys have been sold for some time, were given price ceilings by OPA in Amendment No. 10 to MPR 200 (Rubber Heels) on sales to wholesalers, repairmen and consumers. To the latter, they are 55c per pair attached to shoes. Another change in this amendment permits a wholesaler who sells to another wholesaler to add to his maximum price for heels the same proportion of transportation costs that he added to his selling price in March, 1942. The amendment was issued on August 5 and was effective August 12.

In compliance with the anti-grade labeling provision written into the Emergency Price Control Act of 1942 by the Taft amendment to the Commodity Credit Corporation Act, Amendment No. 11 to MPR 200 was issued, and became effective, on August 5. This amendment removes the requirements of grade labeling for rubber heels. While manufacturers no longer are required to label their heels with the symbols to which grade specifications are tied in the regulation, neither are they prohibited from using those symbols if their heels meet the corresponding specifications, and it is understood that a number of manufacturers plan on continuing to use grade markings voluntarily.

Manufacturers who do not choose to continue marking their heels with the V symbols must sell them at prices established for their heels according to brand names, which prices likewise are established according to the physical tests the heels can meet. If these manufacturers find that the heels bearing brand names but no V symbols cannot meet the abrasion and tensile strength tests for the grade in which the brand name is classified, they must price their heels according to the physical tests they can

meet. Also, they must report this fact to the OPA.

The physical tests are to be applied to determine price classifications only for manufacturers. As wholesalers and retailers have no way to make abrasion and tensile strength tests, they will continue to sell the heels which are not marked with V symbols according to the maximum prices set for each brand name. However, any heels that the wholesalers or retailers have in their possession which do carry the V symbols (V-1, V-2, V-3, or V-4) must be sold at or below the ceiling prices for those grades.

VICTORY FOOTWEAR

Ceiling prices for three types of men's black rubber no-lace mine pacs, the production of which was recently authorized by WPB to meet the needs of miners in copper mines, were established in Amendment No. 7 to MPR 229 (Retail and Wholesale Prices for Victory Line Waterproof Rubber Footwear). The amendment, issued by OPA on August 3 and effective August 10, sets wholesale prices at customary margins above prices charged by manufacturers.

Two provisions are added to the regulation by the same amendment. One is that a seller may make no charge for extension of credit except such as those he made in the base period of February 11 to September 29, 1941. The other is that the seller may add to his maximum price no charge for services rendered the purchaser unless he made such charges in the base period. Any charges so made shall not exceed similar charges made in the base period.

The amendment revokes a provision which required wholesalers and retailers to file their maximum prices with local War Price and Rationing Boards. This requirement, OPA said, no longer serves a useful purpose.

MISCELLANEOUS ORDERS

The manufacture of bonded abrasive products containing aluminum oxide wheel grain (other than reclaimed grain) of any grit size 80 or coarser for certain specific applications is now limited under terms of Conservation Order M-319-a, issued by WPB on July 22. Special limitations are also placed on rubber-bonded abrasive products by the new order. The grade of rubber compound to be used in any such products, however, is governed by Rubber Order R-1.

Expanding previous actions in which certain types of catalysts were withdrawn from price control, OPA issued Amendment No. 21 to Revised Supplementary Regulation 1 on July 21 exempting all catalysts sold for use in the manufacture of synthetic rubber, aviation gasoline, and toluene from petroleum from price control.

All limitation on the use of rubber, either synthetic or natural, as a sealing medium for closures for glass containers have been eliminated from Conservation Order M-104 by an amendment to that order issued by WPB on August 10. The action was taken because WPB has been advised by the Office of the Rubber Director that adequate synthetic rubber is now available for making closures for glass containers for food and other items. Other similar actions are anticipated in the near future.

USED ARMY TIRES TO BE MADE AVAILABLE FOR REGULAR CIVILIAN USE

According to a statement made by Under Secretary of War Robert P. Patterson on July 22, the War Department has worked out a plan with Rubber Director Jeffers under which more than 100,000 Army tires no longer suitable for severe military service will be made available through normal trade channels for civilian use.

Most of these tires, it was disclosed, are suitable for farm trucks and will aid materially in the movement of food to market. Almost all the tires are truck tires of the "off the road" type; few passenger car tires will be made available. The "off the road" tire is the familiar cleated type which is used for heavy-duty cross-country service.

Mr. Patterson pointed out that the distribution of this rubber to civilians is an outgrowth of the Army's tire conservation program. Under this program, experts in every post and camp examine all tires regularly. Unserviceable tires are exchanged for serviceable ones.

At present virtually all tires issued to installations in this country are reconditioned items. New tires are sent overseas. Mileage obtained here by Army reconditioning has been excellent and beyond expectation.

Mr. Patterson emphasized the fact that the tires now made available to the public are serviceable. Military demands upon a tire for cross-country work are exceptionally vigorous. The tires being released will, when repaired, be capable of sustaining many miles of travel on ordinary highways.

Tires retired from use by the Army are turned over to the Defense Supplies Corporation, and will be released for recap and repair through that corporation. Further tires of this type will be released to the public in the future as they become available.

Set Quotas for August

Smaller quotas of new passenger car tires for August and larger quotas of used and recapped tires were announced by OPA on July 26. The number of Grade I tires (new passenger car tires) total 829,000 as compared with 1,061,261 for July.

The total August quota of Grade III tires (used and recapped tires), on the other hand, was raised from 414,931 in July to 644,000 in August. This increase was made possible by the release of the so-called "emergency" tires and will offset to some extent the decrease in the Grade I quota.

Inner tube quotas for August were set at 757,160 for passenger cars and 356,639 for trucks, which compares with 736,500 and 332,056, respectively, for July. August truck tire quotas amount to 417,265 as against 414,977 in July. The quota of farm tractor and implement tires remains unchanged from July at 73,600.

Amendments to Ration Order

Six additional amendments to Ration Order 1A (Tires, Tubes, Recapping and Camelback) have been issued by OPA since our last report, as follows:

Amendment No. 39, issued July 19 and effective July 24, prohibits the sale of new tires as spares during the next few months to any drivers except a relatively few, such as firemen and doctors who sometimes have to use their cars at high speeds.

Amendment No. 40, issued July 19 and effective July 24, states that OPA may issue certificates for tires, tubes or recapping services for privately-owned vehicles operated for official duties by the Army, Navy, Marine Corps, Coast Guard and the law enforcement agencies of the United States.

Amendment No. 41, issued and effective July 19, provides that dealers having in stock used passenger tires that are not fit for recapping but which can be made serviceable for emergency use by temporary repairs, may brand them with an "O" on the sidewall and sell them, with or without repairs, to consumers holding Grade III certificates. Thus branded, these casings will be the same as the "emergency" tires dealers were recently authorized to buy from the Defense Supplies Corp. through the Rubber Manufacturers' Association of America, Inc. Other minor changes are made in the amendment.

Amendment No. 42, issued July 23 and effective July 29, makes provision for the use of OPA Form R-2 Revised, the new tire rationing certificate which takes the place of three different forms heretofore in use.

Amendment No. 43, issued July 23 and effective July 29, covers a plan by which applications for tires, tubes and recapping services for commercial vehicles will be passed upon by tire experts in areas where there are sufficient concentrations of such vehicles to warrant setting up the new procedure. The new procedure, outlined in the amendment, involves changes in the rules governing applications for tires and tubes for immediate use as well as applications for "emergency reserves" of tires and tubes.

Amendment No. 44, issued July 31 and effective August 6, permits the recapping of farm service tires with truck-type

camelback. Two other changes are made in the amendment.

Amendments to MPR 415

Two amendments to MPR 415 (Certain Federal Government Purchases of New Tires and Tubes) have been issued. Amendment No. 1, effective August 2, states that the regulation applies to the District of Columbia, the forty-eight states, and the Territory of Hawaii, but not to any other territories or possessions of the United States. It was issued as a clarification order.

Amendment No. 2 to the regulation, issued on July 30, provides that specific ceiling prices for new rubber tires and tubes intended for the Federal Government, when made wholly or in part of GR-S, will not go into effect until November 1. The ceilings were scheduled to go into effect on August 1, but the industry did not have enough data to bring such tires and tubes under specific price action. Amendment No. 5 to MPR 119 (Original Equipment Tires and Tubes) was issued at the same time for the same purpose.

BICYCLE TIRES

Bicycle tires and tubes have been given dollars-and-cents ceilings for brands sizes and with the issuance by OPA of a new maximum price regulation — MPR 435 — which was effective July 29. It covers sales, at all levels from manufacturer to retailer, the only exceptions being sales to the United States or its agencies and sales in which the price is that of a whole bicycle.

Maximum prices for sales to consumers are no higher than the current level of ceiling prices and affect wire replacements for 10 to 12 million bicycles estimated to be in use in the United States. Nearly 80 per cent of the tires made in 1942 were for replacement sales.

Upward pressure on bicycle tire prices is illustrated by the fact that production of the tires went down to less than 4,200,000 units in 1942 from about 7 million units in 1941, in face of increased use of bicycles due to the gasoline shortage and heavy demands of transportation facilities.

The specific retail prices correct an inflationary tendency that was evident in many wholesale and retail prices for tires in March, 1942, and was reflected in the maximum prices of some sellers when they were frozen at the March, 1942, level by the General Maximum Price Regulation. Besides establishing specific ceilings for all at a fair and equitable level that does not increase the cost of living, the new ceilings for wholesalers and retailers adjust margins over manufacturers' prices which in many cases became out of line in March, 1942.

Ceilings for manufacturers are increased slightly over the level for March, 1942, to provide for increased production costs due to substitutions in raw materials. The increase is absorbed at the wholesale and retail levels, and therefore does not increase the price to the consumer. The absorption does not, however, reduce wholesalers' and retailers' margins below their normal levels of October, 1941.

Amendments to three other regulations were made necessary by the issuance of the new regulation on bicycle tires and tubes, these being: Amendment No. 11 to MPR 220 (Certain Rubber Commodities), Amendment No. 1 to MPR 403 (Certain Rubber Commodities Purchased for Governmental Use), and Amendment No. 2 to Supplementary Regulation 14. Wholesale and retail ceilings for these tires and tubes which formerly were established under GMPR are removed from coverage by that regulation automatically by the issuance of MPR No. 435.

Argentina to Run Plants

The Argentine Government assumed supervision under official decree of three American-owned rubber plants in that country on July 27. The companies concerned were Goodyear Neumatico Sociedad Anonima, Firestone de la Argentina Sociedad Anonima, and Michelin Sociedad Anonima Argentina de Neumaticos. In all, eight factories were taken over for operation by the government, including the British-owned Dunlop Neumatic Tire Co. The action was taken to "investigate charges that the firms violated commercial laws which fix maximum prices and require adequate stocks to be maintained." No comment has been made by the managements of any of the American companies affected by the decree.

Symposium Papers Available

Goodyear Tire & Rubber Co., Akron, has made available a portfolio containing all of the papers presented in the four symposiums which featured the official dedication of the company's new research laboratory at Akron in June. Subjects covered included synthetic rubber, plastics, the chemical industry, and transportation. The symposium on synthetic rubber consisted of four papers, as follows: *Butadiene and Butyl Rubber,* Dr. Per K. Frolich (Standard Oil); *Synthetic Rubber Applications,* Dr. N. A. Shepard (American Cyanamid); *Synthetic Rubber Research,* Dr. L. B. Sebrell (Goodyear); *Synthetic Rubber Program,* Dr. R. P. Dinsmore (Goodyear). Copies of the portfolio may be secured by addressing requests to Dr. Sebrell.

According to Stanco Distributors, Inc., the addition of a new chemical in the manufacture of Pĕrbunan has darkened the finished product somewhat, but has no influence whatsoever upon the quality. In fact, it is stated that the new darker Perbunan is much more constant in quality than the previous lighter Perbunan had been.

FLAT TREADS DEEMED BEST FOR DESERT WARFARE USE

The British Eighth Army moved rapidly across the sands of North Africa partly because of special tires built in Britain from 4-inch models which were tested in trays of sand which showed that a flat tread is better than a round one in the desert, according to the Science Editor of the *New York Times.*

Four different types of tests were evolved. Full-scale tests were made in Britain on the black sands at Port Maddock, and in Egypt on a 910-mile strip from the Pyramids to Mersa Matruh and back again to the Pyramids. Thus the tires had to stand up in all possible kinds of desert sand.

Very fine, soft, dry sand was encountered in the Qattara Depression. There was no hard crust at any depth or at any time of the day, so that restarting was difficult. On sand with a thin, hard crust a truck could stand without breaking through, so long as the crust was unbroken. There was no difficulty in starting. On the other hand, ordinary pneumatic tires broke through the crust, and pushing was necessary to start the truck.

The test car was also tried out on wet sand with a crust of dried salt. The vehicle sank, but the tires stood up. When the car was driven over sand covered with big stones and pebbles, the new tires absorbed the shocks readily.

Mud flats, which have a good surface when dry, were very difficult when wet. Special deep-patterned treads were required.

FEW ALL-SYNTHETIC TIRES FOR CIVILIANS THIS YEAR

Warning motorists not to relax their vigilance against tire abuse to prevent thousands of cars and trucks from being laid up, J. P. Seiberling, president of the Seiberling Rubber Co., in a public statement issued to newspapers on July 18, predicted that there will be very few new all-synthetic tires for civilians this year "because tire manufacturers have not yet licked many problems of synthetic tire production."

Stating that the public has been led to believe that plenty of new tires and tubes made of synthetic rubber will be available very soon, because the job of producing quantities of raw synthetic rubber has been virtually accomplished, Mr. Seiberling made the following emphatic points:

(1) The first all-synthetic passenger car tires to be built on a production basis are just now coming off the lines, in limited quantities; (2) No satisfactory all-synthetic truck tires have been built as yet by anyone; (3) No satisfactory all-synthetic tubes have been built as yet by anyone; (4) There will be very, very few new tires of all-synthetic rubber this year—and it will probably be the middle of next year before civilians can get the new tires they need, even though there will be plenty of raw synthetic rubber.

FOREIGN DEVELOPMENTS SHOW INCREASING NEED FOR RUBBER

Recent reports secured from various sources indicate steps being taken in various foreign countries to meet the drastic shortage of rubber. Some of these, presented by country, follow:

Denmark: A scrap rubber campaign launched in Denmark unearthed sufficient rubber to retread over 10,000 automobile tires during the first 10 months of 1942. The retreading work is supervised by the so-called "Autogummicentralen (Automobile Rubber Central), which inspects the tires and decides on the advisability of repairing. It has been impossible to supply the needs of Denmark's 20,000 trucks which require from 30,000 to 40,000 tires a year.

Bicycles form a very important part of Danish transport, and, during the summer of 1942, 90,000 rubber bicycle tires per month were manufactured, despite difficulties. By early autumn, however, the supply of canvas for the fabric of the tires became short, and promised German deliveries were delayed. It was only by salvaging cotton from two Swedish ships, which sank in the early summer, that a supply of lining material, sufficient to last until the end of the year, was obtained.

Efforts to relieve the rubber situation have taken several forms. Substitute tires made of "wood straw" have been devised. Wooden tires for automobiles have been considered dangerous to road surfaces and have been prohibited. Production of a synthetic rubber, called "Aetylan," was begun in July 1942. Attempts have also been made to cultivate dandelions for rubber. Despite these efforts, Danish stocks of rubber at the beginning of 1943 were critically low.

France: Because of Germany's need for more rubber, French manufacturers have been instructed to use the synthetic product only, quotas of natural rubber being drastically reduced. An official circular is reported to say that no demand for natural rubber made by a French manufacturer can be taken into consideration without an expression of opinion from "the German pilot firm." No clarification of this term was made.

Italy: S. A. Industria Gomma Sintetica, of Milan, has developed plans for expansion of its synthetic rubber production, say European press reports. The project will cost 850,000,000 lire—the Government to provide assistance in the amount of 425,000,000 lire, to be paid in five equal annual installments. In addition, the whole financial transaction is to be tax-free. This company was founded in 1939 jointly by the Pirelli group and the IRI (Instituto Ricostruzione Industriale), the State-owned institute for developing and financing essential industrial enterprises, it is stated.

Sweden: To further the production of artificial rubber from calcium carbide, according to the formula discovered by Professor The Svedberg, Nobel Prize winner, and head of the Physical-Chemical Institute of Uppsala College, the Swedish rubber industry and the Cooperative Union of Sweden have formed a company to provide Professor Svedberg with better facilities for his experiments. The capital of the company has been set at a minimum of 175,000 kronor (about $43,370 at par) and a maximum of 525,000 kronor (about $131,250). A factory and laboratory will be purchased near Uppsala.

Switzerland: Tire imports into Switzerland have virtually ceased, it is stated. So, although the oil shortage has drastically curtailed the circulation of motor vehicles, the rubber shortage threatens to cut down the use of even the small number of vehicles for which fuel is available.

Penalize Old Town Rubber Co.

Because of admitted violations of the terms of Supplementary Orders M-15-b and M-15-b-1 (since superseded by Order RU-1), the Old Town Rubber Co., Old Town, Maine, has been ordered by WPB "to discontinue the compounding, milling, vulcanizing, and molding of rubber of any kind into combined soles and heels or soles or heels" except on certain work which is performed under toll agreements for Goodyear or other companies, with certain provisions. The penalizing order was issued on July 26.

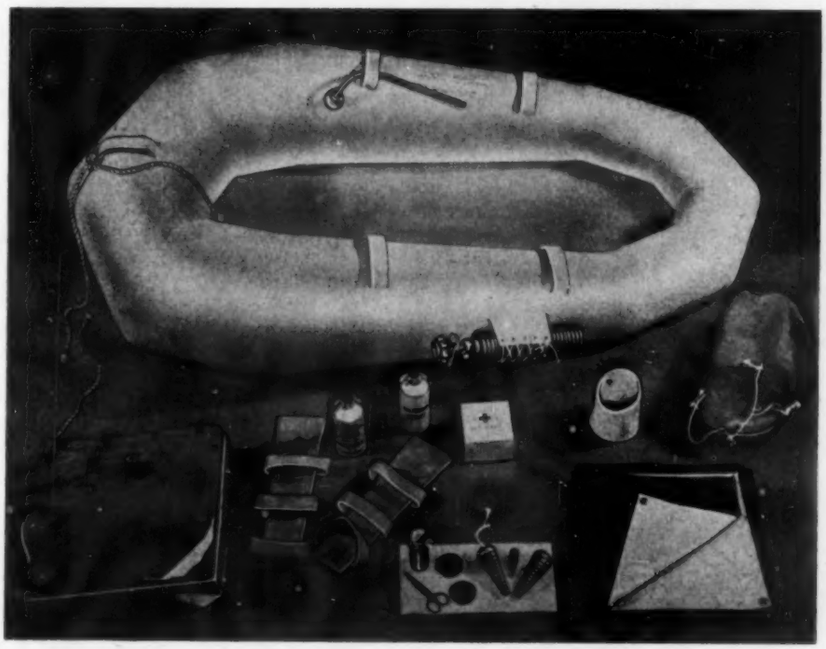
Goodyear Opens Peru Plant

The third plant of the Goodyear Tire & Rubber Co. in South America was officially placed in operation in Lima, Peru, on July 23. In addition to the president of Peru, P. W. Litchfield, Goodyear chairman, Z. C. Oseland, treasurer, and George K. Hinshaw, manager of foreign operations, participated in the opening ceremonies. The new plant, which was opened less than a year from the time construction started, will use Peruvian rubber exclusively. Goodyear's other South American plants are located at Hurlingham, near Buenos Aires, Argentina, and at Sao Paulo, Brazil.

Reduce Price on DuPont Chemicals

The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware, has announced that the price of Aquarex D has been reduced from 75c to 60c per pound in standard container units of 125 pounds, and that the price of SRA No. 1, the new accelerator for GR-S, is now 40c per pound in units of 100 pounds and 38c per pound in ton lots. It has also been announced that in the future Neoprene Latex Type 571 and Neoprene Latex Type 60 will be sold on a dry weight instead of a wet weight basis.

FIRESTONE PARARAFT FURNISHED WITH FULL EQUIPMENT FOR SAFETY



The rubber pararafts being produced at Akron by the Firestone Tire & Rubber Co. are outfitted as completely as possible for safety and protection. Fastened to the raft are a carbon dioxide inflation cylinder and an oral inflation tube. The supplies include paddles that fit over the wrists, a complete repair kit, a first aid kit, drinking water, chemicals to color a patch of ocean and thus attract friendly planes, a sea anchor, a cup for bailing or drinking, and a sail. When deflated, the pararaft and all its supplies fit into the pack at the left, which is only 14x15x 3⅝ inches in size. The full pack weighs only 16 pounds.

NAMES IN THE NEWS

JAMES I. BRENT, long associated with the rubber industry, with considerable experience in the field of tire repair materials, has joined the Keaton Rubber Co., manufacturers of camelback of Newark, N. J., as vice-president in charge of sales.

LEONARD K. FIRESTONE, after 18 months of active service as a lieutenant in the Navy, has been placed on inactive duty and has returned to war work as head of the Los Angeles plant of the Firestone Tire & Rubber Co. He succeeds R. J. COPE, who has retired because of ill health.

LESTER D. CHIRGWIN, general manager of the Buffalo, N. Y., plant of the Farrel-Birmingham Co., Inc., of Ansonia, Conn., has been elected a director of that company. He joined the company in April, 1909, as an office boy.

R. G. COX, who has been with the industrial products division of the B. F. Goodrich Co. for the last 18 years, has been placed in charge of molded goods sales, succeeding E. R. MILLER, recently retired.

NORMAN R. FRANE, assistant secretary of the Western Electric Co., has been elected secretary of the company to succeed HARRY B. GILMORE who retires on September 1 after 41 years of service. MR. FRANE has been associated with the company for 20 years and was made assistant secretary last April.

J. W. VAN RIPER, formerly connected with the Carrier Engineering Co., has joined John Royle & Sons, Paterson, N. J., as a sales engineer. He replaces W. S. LEE who left Royle a few months ago to join the General Cable Co.

R. D. WOOLERY, general manager of the Polson Rubber Co., Garrettsville, Ohio, was the principal speaker at the luncheon meeting of the Ravenna (Ohio) Kiwanis Club held on July 13. He discussed the overall rubber situation.

ROBERT S. MCFADDEN, formerly rubber chemist of the Industrial Tape Corp., New Brunswick, N. J., a subsidiary of Johnson & Johnson, is now connected with the research laboratories of the Eagle Picher Lead Co. at Joplin, Mo., in charge of rubber and synthetic rubber research.

F. A. SEIBERLING, chairman of the board of the Seiberling Rubber Co., has been named to serve as honorary chairman of Akron's post-war planning committee.

Shift Monsanto Executives

Monsanto Chemical Co. has announced the following changes in its organization, all effective November 1: William M. Rand, vice-president and general manager of the Merrimac Division, becomes a member of the executive committee, with headquarters in St. Louis; Daniel S. Dinsmoor, assistant general manager of the Organic Chemicals Division, becomes a vice-president and succeeds Mr. Rand as general manager of the Merrimac Division; Julius A. Beringhaus, general manager of the Organic Chemicals Division, retires under the company's retirement plan; and Osborne Bezanson, vice-president and general manager of the Texas Division, will succeed Mr. Beringhaus as general manager of the Organic Chemicals Division at St. Louis. The Texas Division of the company, with plants at Karnack and Texas City, Texas, will be consolidated and become a part of the Organic Chemicals Division.

FRED W. FRALEY, associated with the Diamond Alkali Co. for the past 15 years, has been appointed vice-president and director of sales of that company. He will be in charge of all sales operations.

T. SPENCER SHORE, vice-president of the General Tire & Rubber Co., will head the Summit County Tuberculosis Association's 1942 Christmas seal drive.

W. R. "BILL" SHERIDAN, who was associated with the Dunlop Tire & Rubber Co., Buffalo, for the past 15 years, recently became affiliated with the engineering department of the Colonial Radio Corp., also of Buffalo, as chemical advisor.

WILLIAM E. DUCK, managing director of the Firestone Tyre & Rubber Co., of England, is currently in this country visiting the Akron factory. Further expansion of the British factory is believed imminent.

P. W. DREW, of the Goodyear Tire & Rubber Co. of California, Los Angeles, is scheduled to deliver an address on "War Tires, Availability and Performance Characteristics," at the West Coast Transportation and Maintenance Meeting of the Society of Automotive Engineers, scheduled for August 19 and 20 in the Palace Hotel at San Francisco.

SUMNER KEITH, formerly connected with the Barbour Welting Co., has joined the staff of the Union Bay State Co., Cambridge, Mass. He will service major shoe factories on their adhesive and finishing problems.

Lewis with Wire Division

M. P. Lewis

M. P. Lewis, associated with the U. S. Rubber Co. since 1919, when he joined the Bristol, R. I., sales department, and who has been serving lately as wire sales manager of the Eastern Division, has been appointed assistant manager of the company's newly-created cable and wire division, it has been announced by C. W. Higbee, manager of the division. Mr. Lewis is a native New Yorker and will maintain headquarters at the New York general offices of the company.

Changes at Polson Rubber

Due to the recent death of Paul A. Polson, executive vice-president, several changes have been made in the executive organization of the company by H. B. Polson, president. R. D. Woolery, secretary-treasurer, who has completed his work with the Ordnance Department in Washington, assumes the additional duties of general manager; J. W. McConnell, general sales manager, has been named director of sales and advertising; William J. Frisby, who has been sales manager of the tire valve division of Jenkins Brothers for the past six years, and who was affiliated with Goodrich for 20 years prior to that connection, has been named sales manager; and Rudolph J. Dittman has joined the company as plant engineer.

A felt boot to meet the need for footwear suitable for wear in temperatures ranging from zero to 30 degrees below zero has been designed by the Quartermaster Corps. It is intended for intermediate wear when the shoepac, which has a rubber foot and a high leather upper, does not afford sufficient protection, and the mukluk, made of light permeable leather and canvas, is too bulky for high maneuverability.

SUGGESTIONS ARE MADE ON ACCOUNTING PRACTICE

The General Accounting Committee of the Rubber Manufacturers Association has made a number of suggestions to rubber manufacturers with respect to complying with the provisions of Circulars 21 and 22 of the Rubber Reserve Co. governing all sales of rubber goods containing natural and certain synthetic rubbers. The suggestions follow:

In Paragraph 3 (C) where reference is made to the reporting of natural and synthetic rubbers used in manufacturing end products under war orders, it is the Committee's suggestion that the rendered invoices be interpreted to mean gross billings less credit memoranda for returned goods.

The Committee also recommends that the rubber content reported should be based on the manufacturer's specification in effect on the first of the accounting month or as determined by the established accounting system of the manufacturer. Whatever method is selected should be used consistently and should be a method that would naturally give the most accurate results.

In classifying rubber usage on Exhibits A, B, C and D, all sales should be classified by the departmental subdivision listed on the forms. The contract symbols listed are indicative but not conclusive evidence of the classification to be followed. In other words, the service corps billed should govern. All services billed which are not individually listed on the above mentioned exhibits for the War Department, Navy Department and Maritime Commission should be reported in total as "All Other" on Exhibit A, B and D. On Exhibit C for the Treasury Department report only those invoices applicable to symbol DA-PTS. Report "All Other" war orders under the miscellaneous caption on Exhibit E. Each manufacturer, however, should keep a list of the agencies included under "All Other" on Exhibit E.

Where both the DA symbol and a W or N symbol appear on the same order or invoice the W or N, that is War or Navy Departments, should govern rather than the DA symbols.

Oroplast Plasticizers

A new series of sulfur-reactive petroleum products specifically developed by the Oronite Chemical Co., San Francisco, Calif., for use as compounding ingredients for natural and synthetic rubber, is offered under the name of Oroplast by the Advance Solvents & Chemical Corp., 245 Fifth Ave., New York City. Advantages claimed for the new sulfur-reactive plasticizers, which are said to be different chemically from any petroleum rubber plasticizers previously marketed, include increased loading possibilities, plasticity, extending action, sulfur reactivity, dispersing and wetting of pigments, good mold flow and removal, and minimum odor.

Expand Nylon Cord Program

In accordance with directives issued by WPB, the nylon cord tire program is being materially enlarged. According to a recent statement by DuPont, the first quantity shipment of nylon yarn was scheduled to go from the plant to six tire companies before the end of July with shipments to increase steadily until the total by the end of the year reaches 750,000 pounds of yarn. Four dozen of the first nylon tires, it was revealed, were sent for test to Wright Field and placed on bombers of the type giving the greatest tire trouble. Since that time small amounts of yarn have been going to each of five rubber companies so that they could acquire established manufacturing techniques. Nylon's advantage is summed up in the fact that it adds to the strength of the tire without adding to its bulk.

Amyloform—A New Compound

Amyloform, a new formaldehyde-carbohydrate condensation product, offered by the Perkins Glue Co., Lansdale, Penna., is reported to have some interesting properties in connection with the processing of both natural and synthetic rubber. Amyloform is an extremely finely divided soft white organic powder with a large specific surface. It is said to be unusually inert for a soft organic material, and its resistance to change compares favorably or exceeds the more durable resins. Its value in rubber is reported to be as a reinforcer.

Standard Hydrocarbon Samples

At the urgent request of several organizations, including the Petroleum Industry War Council, plans have been prepared for the provision by the National Bureau of Standards, Washington, D. C., of standard samples of hydrocarbons of a known high purity, for use in calibrating the following apparatus and instruments used in the rubber, petroleum and allied industries: mass spectrometers, infrared spectrographs, ultraviolet spectrographs, Raman spectrographs, refractometers, pycnometers and specific gravity balances, boiling-point apparatus, freezing-point apparatus, molecular weight apparatus, bomb-combustion calorimeter for volatile liquids. Actual operations were scheduled to start on July 1.

La Favorite Put on Probation

In the first case of its kind, the La Favorite Rubber Manufacturing Co., Hawthorne, N. J., has been placed on probation for violation of the terms of Supplementary Order M-15-b (since replaced with RU-1) instead of being given a severe penalty, the War Production Board announced last month. A long record of useful production and evidence that a "negligent disregard" of government regulations rather than deliberate intent to violate these regulations led to the decision to place the company on probation until November 30. The violations were represented to be due primarily to an inadequate system of control and material accounting.

MEMBERS OF BOSTON RUBBER GROUP ENJOYED ITS ANNUAL OUTING

It is apparent from the expressions of the above members of the Boston Rubber Group that they enjoyed the annual outing held at the Commonwealth Country Club on July 25, a full report of which was made in our last issue. In the group above, left to right, are: Carl Meyer (Barrett), James R. Geenty (Reading Rubber), Lawrence D. Ackerman (Converse Rubber), Lawrence R. Clarke (Haartz-Mason-Grower), Harry A. Atwater (Hood Rubber), Joseph L. Haas (Hodgman Rubber), and Donald D. Wright (Hood Rubber). The photograph was taken by Al Lukens (Thompson-Weinman).

FINANCIAL NEWS

U. S. RUBBER CO. PROFITS INCREASE TO $6,912,466

Net income of the United States Rubber Co. for the first six months of 1943 amounted to $6,912,466, after all charges, including provision for excess profits and income taxes and for all other requirements which will not be determined until a later date. Net income for the corresponding period of the previous year was $1,554,841.

After provision for $4.00 in dividends on the 8% preferred stock, the profit for the first half of 1943 is equal to $2.44 a share on 1,759,092 shares of common stock outstanding. After special provision for war losses of $2,741,649 and other charges, the 1942 income was equal to $2.39 a share on the preferred stock. Provision for taxes, including Federal excess profits taxes, amounted to $17,820,414, contrasted with $13,189,822 in the 1942 period.

Consolidated net sales, exclusive of the large volume of business done for the government on a cost-plus fixed fee basis, amounted to $202,718,494, an increase of $71,903,599, or 55%, over the $130,814,895 net sales in the first half of 1942.

The report included the statement that F. B. Davis, Jr., chairman of the board, exercised the remainder of his option on 25,000 shares of common stock by purchasing 20,000 shares on June 10, 1942. This option was granted under the stock option plan approved by stockholders in 1936. It also revealed that the number of employees registered another sharp increase, totaling 92,497 as of June 30, compared with 80,684 at the close of 1942.

In commenting on the report, Mr. Davis said that the three copolymer plants operated by U.S. Rubber, at Institute, West Virginia; Naugatuck, Conn., and Los Angeles, respectively, have a rated annual capacity of 150,000 tons of GR-S, "which is equivalent to nearly one-quarter of the normal consumption of rubber in this country for all purposes."

St. Joseph Lead Co.

First Half: Net profit of $2,697,084, after provision of $1,468,206 for Federal income and excess profits taxes and after deducting $66,902 as a post-war refund, equal to $1.38 a share on 1,955,680 shares outstanding, which compares with $2,142,208, or $1.09 a share, reported for the first six months of 1942 when $3,895,785 was provided for Federal taxes.

Intercontinental Rubber Co.

First Half: Net income of $384,181, after all taxes and charges, equal to 64c each on 595,832 shares of common capital stock, which compares with $177,553, or 29c a share, in the corresponding period of the previous year. The company reports that its production of guayule in Mexico amounted to 7,001,600 pounds in the first half of this year as compared with 6,359,500 pounds in the similar period of 1942.

General Tire & Rubber Co.

Six Months Ended May 31: Net profit of $962,265, after provision of $4,112,265 for Federal income and excess profits taxes, equal to $1.70 per share, which compares with $64,210, after tax provision of $1,292,210, or $1.09 per share, in the corresponding period of the previous year. Net sales for the period amounted to $25,910,741, or 82% greater than the $13,391,741 reported for the corresponding period of 1942.

Dewey & Almy Chemical Co.

First Half: Net income of $289,047, equal to 98c a share on 295,317 shares, which compares with $238,570, or 81c a share, reported for the corresponding period of the previous year. The company's synthetic rubber plant is now believed to be in operation.

Firestone Aircraft Co. has acquired G & A Aircraft, Inc., an important factor in the glider, autogiro and helicopter business. The latter company was an extension of the Pitcairn Autogiro Co. and has a plant at Willow Grove, Pennsylvania, a suburb of Philadelphia.

Goodyear Tire & Rubber Co., Akron, has retained the firm of H. A. Bruno & Associates, New York, as public relations counsel. Larry Nixon will act as account executive.

All Army rubber footwear procured by the Quartermaster Corps is now being manufactured with 30% less crude rubber than has heretofore been used, it is reported by the War Department. GR-S has been substituted for the crude rubber.

U. S. Industrial Alcohol Co. and U. S. Industrial Chemicals, Inc., the latter an operating subsidiary of the former, have been merged into one company which will be known as U. S. Industrial Chemicals, Inc., which more accurately indicates the business of the two concerns.

U. S. Patent No. 2,324,583, relating to the manufacture of cords for tires, was recently granted to the Celanese Corporation of America. It covers the preparation of tire cords from cellulosic staple fibers.

Heels and Soles for Skis

What are said to be the world's first successful rubber heels and soles for ski-troop footwear are now in production by the Goodyear Tire & Rubber Co. The footwear utilizes a design which provides perfect traction on stone and ice, replacing steel cleats, and is said to be an improvement on a design originally adopted by Swiss mountain guides and Italian Army mountain troops. The rubber soles and heels are warmer with no metal to conduct heat away from the soldiers' feet, they are more waterproof than the leather on which cleats are mounted in conventional boots, and the boots are lighter and consequently less fatiguing than the old type. With the new design, developed by Goodyear and the Quartermaster Corps, the mountain-climbing boots automatically clean themselves of snow or ice, in addition to providing firmer grips on hard or slippery surfaces, each time the boot is flexed.

Bound hair, composed of animal hair mixed with a small percentage of reclaimed rubber, is being widely used as a substitute for foamed latex, according to a report from the Firestone Tire & Rubber Co. Bound hair cushions, it is stated, can be made full depth, thus eliminating springs. If springs are required, the bound hair can be used as a pad over the springs.

A bulletin on the compounding of GR-S for insulation and jackets has been prepared by the Office of the Rubber Director. The bulletin is restricted and is available only to reputable rubber manufacturers requiring information on the subject.

An interesting booklet on "Synthetic Rubber—Its Influence on Rubber Securities" has been issued by Hirsch, Lilienthal & Co., stock brokers of 25 Broad St., New York City. Such synthetics as Buna S, Buna N, neoprene and Thiokol are discussed.

Recent Price Interpretations

Included among recent price interpretations of various specific schedules and regulations revealed by OPA in the past few weeks were the following of direct interest to the rubber industry:

MPR No. 188—Cigar and cigarette holders made of hard rubber or balata are covered by this regulation as "smokers' articles—cigarette and cigar holders"; even though made of rubber, they are not covered by MPR No. 149 (Mechanical Rubber Goods) or MPR No. 220 (Certain Rubber Commodities).

MPR No. 149—Industrial tape made in whole or in part of rubber is subject to this regulation as "tape, except cable wrapping tape and surgical adhesive tape." Adhesive discs, adhesive squares, double-faced adhesive tape, Picotape, adhesive strip and adhesive "thread protectors" are "tape" within the meaning of the regulation; however, if used for medical and surgical purposes such tape is subject to MPR No. 188.

MPR No. 220 — Tire patches, even though semi-finished, are subject to this regulation as "Tire repair materials," Appendix A (g).

Amendment No. 3 to MPR No. 220 requires in certain cases the deduction of the Federal excise tax which was formerly paid on rubber commodities. The deduction to be made shall be figured on the basis of each entire sale or delivery. The maximum price for the entire sale or delivery shall be calculated to the nearest cent, by dropping fractions less than ½ cent and increasing to the nearest cent where the fraction is ½ or more, after the exact amount of tax on the entire order has been deducted. By requiring manufacturers to figure the deduction of the tax in this manner, it becomes immaterial that the amount of the tax on each individual item may be a figure involving fractional cents. Printed price lists which quote prices on each item need not be reprinted in fractional cents. It is sufficient that the list include a written statement to the effect that the amount of the tax should be deducted on sales by the manufacturer.

MPR No. 300—This regulation, as well as MPR 301, applies to industrial gloves made of rubber, synthetic rubber, rubberized fabric, or synthetic rubber-coated fabric.

MPR No. 301—A doctor of medicine who sells or delivers at retail or wholesale any rubber drug sundries listed in Appendix A which were produced after January 31, 1943, is subject to this regulation; if a doctor of medicine buys or receives from a manufacturer any rubber drug sundries listed in Appendix A of MPR No. 300 which are produced after February 1, 1943, the prices charged him are subject to that regulation.

MPR No. 107—A commercial user of used tires and tubes, such as a taxicab company, is not a "person in the business of buying or selling used tires or tubes" within the meaning of Section 1315.1351, since the regulation applies only to purchasers who intend to resell the tires or tubes in some manner; however, a used car dealer who buys used tires to install on cars which he is selling is subject to the regulation. Used airplane tires and tubes are not covered by the regulation; the GMPR applies.

MPR No. 143—The Y Tire Company acquired farm equipment tires from another tire company. The tires carry brands owned by Y's competitors and have customarily sold in the wholesale trade at 5% below the Y Company's prices. The maximum wholesale prices for these tires is that for Y Company tires of comparable type, quality and size, adjusted in accordance with the 5% price differentials prevailing in the industry on March 1, 1942, Section 1315.1501 (a) (1) (iii).

MPR No. 300 — A chain drug store company purchases rubber drug sundries under the company's private brand from a manufacturer. The sundries are not finished, packaged or assembled. The manufacturer also sells the sundries under its brand name. If the chain store company resells the sundries primarily to wholesalers, or resells them primarily other than at retail under its brand, the company is a "distributor," since the sundries sold by the company bear a different brand and therefore are different articles than those sold by the manufacturer under his brand.

Coming Events

Sept. 6-10. American Chemical Society, 106th Meeting, Pittsburgh, Penna.

Sept. 16. Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y.

Oct. 5-7. Rubber Division, ACS., Fall Meeting, Hotel Commodore, New York, N. Y.

Oct. 5-7. National Safety Council, Sherman, LaSalle and Morrison Hotels, Chicago, Ill.

Dec. 6-11. 19th Exposition of Chemical Industries, Madison Square Garden, New York City.

2-Vinylpyridine Available

A new raw material—2-vinylpyridine—recently made available by the Reilly Tar & Chemical Corp., Indianapolis, Ind., is said to offer interesting possibilities in the development of synthetic elastomers. According to the company's chemists, 2-vinylpyridine, which is the pyridine analog of styrene, copolymerizes similarly with butadiene and styrene, and with butadiene and styrene together, to form an elastomer which has interesting properties. The material boils at 159°C. and can be distilled at about 98°C. at 100 mm. It is soluble to the extent of about 2.5% in water and is readily emulsified with water, approximately 15% of the water dissolving in it.

Two New Huber Materials

Two new materials—JMH and Turgum S—were recently introduced by J. M. Huber, Inc., 460 West 34th St., New York 1, N. Y. JMH is a chemical peptizer for GR-S. It is a brown powder with a specific gravity of 1.36 and a melting range of 86 to 91°C. It is said to have excellent stability but should be stored in a cool place. It requires 3 to 5 minutes Banbury mixing at approximately 325°F. and for this reason has not yet been adapted to open mill operations. The material disperses completely in the polymer. A range of 0.5 to 1.25 for polymers within the Government specifications of 45 to 55 Mooney is recommended. Turgum S, the second new material, is a solid form of Turgum (refined gum turpentine) which is more adaptable to the handling facilities of some plants. It is said to be equally effective as Turgum and to be decidedly cheaper both in cost per pound and lower loading. Laboratory tests have indicated that 8½ parts of Turgum S will replace 10 parts of Turgum without noticeable differences in results.

Chemicals from Seaweed

Dr. E. Marion Delf, one of England's prominent technologists, recently reported to the Royal Society of Arts on chemical products from seaweed. In the report, it was pointed out that Irish moss was used to replace gelatine during the last war and that it has since been determined that alginic acid extracted by boiling from the brown algae yields a rubbery mass suitable for the production of typewriter platens and other products when treated with proper vulcanizing agents. An alkaline solution of algin, when mixed with a small proportion of tannic acid, will yield a transparent film described as resembling cellophane, which is cheap, almost noninflammable, and less influenced by light than cellophane itself.

Accelerator for GR-S

SRA No. 1, a new general purpose accelerator for use in GR-S compounds, has been introduced by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. The new accelerator is said to offer safe processing, fast curing, economy, and to be easy to use and to produce vulcanizates having good physical properties and resistance to aging. SRA No. 1 is a physical mixture of MBT and DPG, is a light cream colored powder, has a specific gravity of 1.28, and a melting point of 166° C.

N. L. Kuehn Company, one of the better known distributors of mechanical rubber goods and molded specialties, with headquarters in Milwaukee, Wisconsin, is celebrating its 20th anniversary this year. Goodyear, Hood Rubber and Western Rubber are among the firms the company represents.

Who's Who in Washington—and Where

(As of August 11, 1943—Compiled by the Staff of RUBBER AGE)

OFFICE OF THE RUBBER DIRECTOR

New Municipal Building, 4th and D Sts., N.W., Washington, D. C.

Rubber Director—William Martin Jeffers.
Deputy Rubber Director—Col. Bradley Dewey.
Assistants—Morehead Patterson and Stanley Osborn.
Assistant Deputy Rubber Directors—L. D. Tompkins (Operations), Frank R. Creedon (Plant Construction), E. B. Babcock (Technology and Specifications), E. R. Gilliland (Research and Development of Synthetics).
Administrative Officer—Frank P. Downey, Jr.
Head, Education Program—Dr. H. E. Simmons, assisted by J. M. Ball (Editorial), E. B. Busenberg (Reclaim), D. F. Fraser (Neoprene), C. W. Sanderson (Thiokol), A. H. Nellen (Tires and Tubes), R. F. Wolf (Butyl), Arthur Nolan (Latex and Dispersions), and M. N. Harocopo (Statistics).
Manager, Priorities and Materials Control—S. P. Dorsey.
Manager, Allocations—George B. Kayser.
Head, Product Specifications—C. S. Reynolds, assisted by V. R. Grainger, Walter Juve (Wire and Cable, etc.), R. C. Dabney (Tape, Proofed Fabrics, etc.), R. J. Hull (Tires and Tubes, etc.), S. C. Compher (Tire Retreading), and Addis Finney (Revision of Specifications).
Head, Natural Rubber—Atherton Lee.
Manager, Requirements and Capacities—James H. Higgins.
Supervisor, Mechanical Goods—J. E. Skane.
Research Associates—A. E. Boss, R. A. Crawford, D. A. Cutler, J. C. Elgin, Harry L. Fisher, C. S. Fuller, P. S. Greer, George Haslam, L. J. D. Healy, J. E. Hutchman, R. W. Kixmiller, G. Lyons, M. Rea Paul, C. W. Perry, C. F. Prutton, Norman A. Shepard, J. E. Troyan, P. H. Watkins, W. B. Wiegand, and R. R. Williams.

RUBBER DEVELOPMENT CORPORATION

1626 K St., N.W., Washington, D. C.

Chairman of the Board—W. L. Clayton.
President—Douglas H. Allen.
Assistants—R. B. Bogardus, James C. Roberts, and R. O. Case.
Vice-Presidents—John W. Bicknell, Reed Chambers, S. M. MacAshan, Paul B. Mckee, and Wm. E. Mitchell.
Assistants—Curtis E. Anderson, and Harry Shere.
Treasurer—W. C. Beck, Jr., and Frank Farrington.
Budget Office—Don C. Carnes and Wm. J. McNamee.
Head Field Technician—C. B. Manifold.
Associates—Earl M. Blair and W. A. Stanton.
Regional Administration—
Brazil—R. B. Bogardus.
Bolivia, Peru—James C. Roberts and Walter A. Graham.
Other South America—Bernard B. Carlin and E. W. Mills.
Central America and Mexico—Harland J. Corson and Robert M. Hutchins.
Plantations—M. D. Knapp and Valentine O. Goodell.
Supplies Procurement—E. B. Murphy and Norman D. McDonald.
Priorities and Export Regulations—Roland H. Rife.
Rubber Purchasing—L. B. Proctor and George Pell.
Rubber Products Distribution—Richard Cooke and Harry A. Carragher.
Commercial Research—Everett G. Holt and Joshua F. Dunbar.
Aviation Division—Ford Studebaker.
Traffic—A. J. Gariepy.
Communications—Everard Stuhrman.
Marine Division—Wm. E. Flanagan.
Personnel—Charles B. Rollins and John C. Lang.

Note: Supplies Procurement Office in H.O.L.C. Building, 1st and Indiana Ave., N.W., Washington, D. C.

RUBBER RESERVE COMPANY

811 Vermont Ave., N.W., Washington, D. C.

Chairman of the Board—Jesse H. Jones.
President—Howard J. Klossner.
Special Assistant—China R. Clarke.
Vice-Presidents—R. D. Young, Henry A. Mulligan, Stanley T. Crossland and John W. Livingston.
Secretary—George H. Hubert.
Treasurer—W. C. Beck, Jr.
General Counsel—H. Clay Johnson.
Consultant—A. L. Viles.
Scrap Rubber—W. J. McCauley.
Latex—Richard Baybutt.
Sales—H. C. Bugbee.
Chief, Administration Division—W. H. Sullivan.

OFFICE OF PRICE ADMINISTRATION

Third and Independence Ave., N.W., Washington, D. C.

Rubber Price Branch

Price Executive—Lester V. Chandler.
Chief Counsel—John N. Cole.
Head, Raw Materials and Financial Section—George W. Bolton.
Head, Tire Price Section—Robert V. Mitchell.
Head, Other Rubber Products Section—Everett D. Hawkins.
Head, Rubber Section, Accounting Division—John S. Bartlett.
Head, Rubber Section, Standards Division—T. M. Miller.
Head, Special Projects Section—Kenneth E. Lawton.
Administrative Officer—Arthur F. Schalk, Jr.

Automotive Supply Rationing Division

Director—Charles F. Phillips.
Legal Counsel—David L. Lloyd.
Head, Field Section—H. C. Butkiewicz.
Assistants—J. W. Bonbrest (Tires) and H. F. McGrath (gasoline).
Administrative Officer—John B. Annett.
Chief, Tire Rationing Branch—S. E. Bonnett.
Assistant—James Leavey.
Heads, Tire Rationing Branch—R. G. Leeth (Eligibility Section), A. Koehler (Tire Industry Section), A. G. Richtmyer (Research Section), L. A. Brown (Tire Inspection Section), and Frank Dougall (Quota Section).

GUAYULE EMERGENCY RUBBER PROJECT

315 West 9th Street, Los Angeles, California

Assistant Chief, Forest Service—C. M. Granger.*
Executive Officer—G. R. Salmond.*
Acting Director—Paul H. Roberts.
Assistant Director—E. L. Perry.
Chiefs—L. C. Stockdale (Business Management), J. R. Nelson (Personnel and Labor), John L. Emerson (Nursery Management), Henry L. Lobenstein (Plantation Management), Dr. W. G. McGinnies (Surveys and Investigations), James J. Byrne (Engineering and Mill Operation).
Director of Research—Dr. A. C. Hildreth.
Assistants—Dr. LeRoy Powers (Plant Breeding), Dr. Hamilton P. Traub (Plant Physiology), Dr. William A. Campbell (Pathology), Delmar C. Tingey (Agronomy), Dr. Omar J. Kelley (Soils), Raiford L. Holmes (Rubber Analyses), Harold W. Reynolds (Indicator Plots), S. W. McBirney (Agricultural Machinery).
Entomology—T. P. Cassidy.

Note: Most of the personnel listed above are members of the Forest Service, while others are officially members of the Bureau of Plant Industry. They are all located at the Los Angeles address, except those indicated by an asterisk, the latter being located at the Department of Agriculture in Washington, D. C.

LOS ANGELES NEWS

About eighty-five members and guests of the Los Angeles Rubber Group participated in the second annual summer outing, this year known as the '49 Party. The scene was the Uplifters' Club on the old Will Rogers ranch in Santa Monica, and the dates were Saturday and Sunday, July 24 and 25. This event both last year and this year took the place of the fishing party which had up until 1942 been the big summer event.

The most outstanding single feature of the party was the appearance of Joe E. Brown, movie star and sportsman, recently home from a long entertaining tour throughout the South Pacific, who spoke at the breakfast on Sunday morning.

Phil Drew arranged a program of sports which kept all the men busy during the two days, while prizes were so freely given by various companies interested in the rubber industry either directly or indirectly that every man participating received a prize of some kind.

As the name of the party indicates the '49er spirit entered into the frolic and a costume party with prizes for the best costumes worn at the roast beef supper Saturday night. Al Pickard acted as program chairman while Curtis Wolter had charge of the sale of tickets. (A more detailed story with pictures will appear in the next issue.)

Jack Sommers, Goodyear mechanic, recently was awarded a prize of $500 for the most helpful suggestion offered in the employee suggestion program in the Goodyear plant. All adopted ideas win cash awards, the more valuable the idea, the larger the award.

Sixteen thousand square feet of floor space is being added to the new plant of Standard Rubber, Inc., at Compton and Gage Avenues. This addition gives a total floor space of 34,000 square feet. The addition is a brick, one-story building, slated for completion in 75 days from the time of ground breaking.

Charles J. Roese (Goodyear), chairman of the Los Angeles Rubber Group, acting as a member of a special mission for the A.A.F., flew to England and back recently, being gone from America for about six weeks.

Howard Lein, former owner of the Atlas Sponge Rubber Company, now an employee of the Kirkhill Rubber Company, is recovering from an operation for appendicitis. Mr. Lein after returning from Minnesota where he spent a portion of a year on his farm went into defense work at a local airplane factory. Only a few weeks ago he joined Kirkhill.

Bob Caldwell, who for a considerable time was associated with the E. M. Smith Company (now the Grizzly Manufacturing Company) but who is now connected with the Mare Island Rubber Laboratory, spent a few days in Los Angeles this month visiting his old friends in the industry.

W. F. Sturdivant (Standard Rubber) is the father of a beautiful girl who weighed into the terrestrial ring at seven pounds and who bears the proud name of Sharon Sue.

Charley Kuhn (Standard Rubber) has returned from a business trip that took him to Huntington, West Virginia; Nashville, Tennessee, and other points east.

E. M. Cunnington of Stanco Distributors, Inc., whose offices are in New York City, left for the East on August 6, after spending considerable time in the West on a business mission.

The Northern California Rubber Group, whose regular monthly meetings are held in Oakland, had its first annual summer outing recently at the old Hearst Ranch near Dublin, California. The families of the members participated in the event.

Sid Pike of the T. A. Desmond Company, New York brokerage company dealing in crude and synthetic rubber, spent two weeks in the Los Angeles area recently leaving for New York early in August.

Herman Jordan (DuPont), who had his nose quite seriously injured in a baseball game, a feature of the annual summer outing of the Los Angeles Rubber Group, July 25, reports that he is well on the road to recovery and will soon be as good as new.

Harry Franklin, manager of the Arrowhead Rubber Company, has returned from a trip to Wright Field, Dayton, Ohio, and to Dallas, Texas. At the latter place he visited the Arrowhead Rubber Company of Texas.

C. J. Roese, chairman of the Los Angeles Rubber Group, reports that more than $300 was raised at the annual outing for the Pacific Recreation Fund which is sponsored by Joe E. Brown, movie star, the purpose of which is to purchase athletic equipment for service men. An All-Star Service Game to be played on August 21, Wrigley Field, Los Angeles, for the purpose of raising money for this fund received the hearty support of the Rubber Group with the promise of the purchase of at least 100 tickets at $1.25 each.

Women Building Tires

The feminine touch is going into many of the new tires as tire manufacturers recruit women for tire building, one of the toughest jobs in the rubber industry. In the accompanying photograph, one of the new female employees at the plant of the Seiberling Rubber Co. is operating the foot pedals that turn the tire drum while the tread stock is being applied to the carcass. Veteran tiremakers admit that the girls are holding their own in the manufacture of tires.

Fifes used in Army bands and drum corps, heretofore made of rubber, cork, brass and nickel, are now being fabricated of cellulose acetate butyrate. The new fife was developed by the Quartermaster Corps in collaboration with a leading band instrument manufacturer.

The completion of a million pound dry cell carbon plant at Pampa, Texas, has been announced by Godfrey L. Cabot, Inc., Boston. The new product is expected to help relieve the shortage of a critical material for the dry cell battery industry.

A patent covering golf balls with centers of cane sugar inside a core of rubber was recently granted to Richard A. Crawford of Goodrich. The new center, which may include sugar and water, will be permanently liquid even at low temperature, according to the inventor.

A commercial standard covering vulcanized tire repairs for passenger, truck and bus tires has been issued by the Division of Trade Standards of the National Bureau of Standards, Washington, D. C. It is identified as CS-110-43 and relates to new production from August 20, 1943.

A new booklet on wartime facts regarding the fabric rubber sole shoe situation has been issued by the Footwear Division of the U.S. Rubber Co. It also contains hints on conservation of rubber-soled shoes.

CANADIAN NEWS

The misleading advertising about synthetic rubber tires which is coming to be almost common practice in the States, is not going to be permitted in Canada.

According to a recent order issued by J. A. Martin, deputy rubber controller, there will be no advertising of synthetic rubber or of products made from vulcanizable synthetic rubber. It is reported that the order was issued at the request of the majority of rubber companies in the Dominion.

The order states that: "Effective immediately, advertising of vulcanizable synthetic rubber or articles made of vulcanizable synthetic rubber is not allowed." Advertising is defined as including "all forms of publicity" and to include newspapers, magazines, trade papers, handbills, readers, catalogs, direct mail, billboards, posters, window displays and streamers.

It is permissible for tire dealers to display tires in their windows as a sign of their trade although no mention is to be made of synthetic rubber. Company publicity stressing the conservation of rubber goods by proper care is also in order but no mention is to be made in it of synthetic rubber.

One reason for the action is that synthetic rubber tires, as they come on the market, will carry no trade names. Another reason is that although industrial products may carry the names of the manufacturers, the amount, number of products, and formula for each is completely standardized.

Domestic manufacture of synthetic rubber will be underway in the Dominion very shortly. Early in July, the first crude styrene was manufactured by the Dow Chemical Company of Canada at Sarnia, Ontario, site of the Polymer Corporation's synthetic rubber plant. The butadiene plant of the St. Clair Processing Corporation is not quite completed but when this is finished production of Buna S rubber will begin.

The Seiberling Rubber Company of Canada, Ltd., Toronto, is extending its plant with a two-story addition measuring 104 feet by 60 feet and a further one-story addition which is 104 feet by 80 feet. The new building will be used to house a Banbury and mills made necessary by the increasing amounts of synthetics which the company has to process. Additional storage facilities will also be provided. It is expected that the building will be completed and the new equipment installed by October.

Viceroy Manufacturing Co., Ltd., reported net profits of $49,580 for the fiscal year as compared with $80,368 for the previous year. No common dividend was paid compared with the $1 a share paid in the previous year but bonds were reduced by $125,000 and 3,250 preference shares were redeemed. Total earnings for the year amounted to $641,316 compared with $479,487 in the previous year.

Several members of the Canadian rubber industry were honored by being elected to various offices in the Canadian Manufacturers Association during the annual convention held recently in Toronto. The list includes W. H. Funston, Firestone, A. G. Partridge, Goodyear, and W. H. Miner, of Miner Rubber, who were named to the Executive Council of the Association. Committee assignments included: *Tariff*, L. L. McMurray, Gutta Percha, D. W. Buchanan, Viceroy, and H. S. Ireland, Canadian General Rubber; *Transportation*, Norman Boyd, Gutta Percha, and W. C. Thompson, Goodyear; *Legislation*, T. M. Mayberry, Firestone; *Industrial Relations*, C. E. Shumaker, Goodyear, T. M. Mayberry, Firestone, J. R. Belton, Gutta Percha, and W. H. Miner; *Insurance*, F. A. Warren, Gutta Percha; *Commercial Intelligence*, J. A. Eltherington, Goodyear, W. H. Funston, Firestone, and C. S. Pope, Gutta Percha; *Publishing*, G. W. Sawin, Goodrich.

Additional "E" Awards

Included among companies receiving the Army-Navy "E" award for production efficiency in recent weeks were the following:

Dewey & Almy Chemical Co., Cambridge, Mass.

Gates Rubber Co., Denver, Colorado.

Niagara Alkali Co., Niagara Falls, N. Y.

Taylor Instrument Cos., Rochester, N. Y.

OBITUARIES

Stephen Segi

Stephen Segi, airship production superintendent of the Goodyear Aircraft Corporation, a firm believer in the future of lighter-than-air craft, died at his home, 273 Oak Grove Drive, Akron, Ohio, on July 28, at the age of 43. Death was attributed to a heart ailment previously suffered while on a vacation trip to Canada. Born in what was once Austria-Hungary, Mr. Segi came to the United States as a boy. He lived in Sharon, Pennsylvania, until he joined Goodyear in 1919. A gifted mechanic, he was transferred to Goodyear-Zeppelin when it was first organized, later did miscellaneous mechanical engineering for the parent organization, and was made superintendent of airship construction two years ago when the anti-submarine campaign was launched. A widow and son survive.

A. S. Hardy

A. S. Hardy, retired executive of the Manhattan Rubber Manufacturing Co., now a division of Raybestos-Manhattan, Inc., died at his summer home in Sea Meadow on August 5 at the age of 79. Born in Bombay, India, Mr. Hardy traveled the Far East extensively and became interested in crude rubber activities at an early age. He became associated with Manhattan Rubber in 1903 and remained with that company until his retirement in 1934. His father, A. H. Hardy, was one of the founders and directors of the company.

Earl F. Glover

Earl F. Glover, president of Air Cruisers, Inc., of Clifton, N. J., died in St. Mary's Hospital, Passaic, on July 16, after an illness of several weeks. He was 51 years of age. Born in Utica, N. Y., Mr. Glover came to Clifton in 1931 and established Air Cruisers, Inc., which manufactured rubber boats and accessories. Since the war began, the company has been producing barrage balloons, life rafts and other military rubber products. A son and three brothers survive.

Harold D. Cameron

Harold D. Cameron, manager of the lighter-than-air division of the General Tire & Rubber Co., was one of twenty persons killed when an American Airlines transport plane crashed near Bowling Green, Kentucky, on July 29. Only two passengers survived the crash, the rest being burned to death. Funeral services for Mr. Cameron, who was 49 years of age, were to have been held in Akron early this month.

Robert B. Dornan

Robert Beach Dornan, vice-president and a director of the Rubberset Company of Newark, N. J., died in East Orange on August 3 of a heart attack. He was 43 years of age. Mr. Dornan was a graduate of Rutgers, class of 1922, and was in the oil business before joining Rubberset in 1936.

IF YOU'RE MAKING MORE MONEY

...WATCH OUT!

WE WANT TO WARN YOU, before you read this page, that you've got to use your head to understand it.

We also want to warn you that—if you don't bother to read it carefully enough to understand it—you may wake up after this war as poor as a church mouse.

• • •

This year Americans are going to make—minus taxes—125 billion dollars.

But this year, we civilians are not going to have 125 billion dollars' worth of goods to spend this on. We're only going to have 80 billion dollars' worth. The rest of our goods are being used to fight the war.

That leaves 45 billion dollars' worth of money burning in our jeans.

Well, we can do 2 things with this 45 billion dollars. One will make us all poor after the war. The other way will make us decently prosperous.

This way the 45 billion dollars will make us poor

If each of us should take his share of this 45 billion dollars (which averages approximately $330 per person) and hustle out to buy all he could with it—what would happen is what happens at an auction where every farmer there wants a horse that's up for sale.

● If we tried to buy all we wanted, we would bid the prices of things up and up and up. Instead of paying $10 for a dress we're going to pay $15. Instead of $5 for a pair of shoes we're going to pay $8.

This bidding for scarce goods is going to raise prices faster than wages. Wages just won't keep up.

So what will people do?

U. S. workers will ask for more money. Since labor is scarce, a lot of them will get it. Then farmers and business men who

feel the pinch are going to ask more money for their goods.

And prices will go *still higher*. And the majority of us will be in that same old spot again—only worse.

This is what is known as Inflation.

Our government is doing a lot of things to keep prices down . . . rationing the scarcest goods, putting ceiling prices on things, stabilizing wages, increasing taxes.

But the government can't do the *whole job*. So let's see what *we* can do about it.

This way the 45 billion dollars will make us prosperous

If, instead of running out with our extra dough, and trying to bid on everything in sight, we buy only what we absolutely need, we will come out all right.

If, for instance, we put this money into (1) Taxes; (2) War Bonds; (3) Paying off old debts; (4) Life Insurance; and (5) The Bank, we don't bid up the prices of goods at all. And if besides doing this we (6) refuse to pay more than the ceiling prices; and (7) ask no more for what we have to sell—no more in wages, no more for goods—*prices stay where they are now.*

And we pile up a bank account. We have our family protected in case we die. We have War Bonds that'll make the down payment on a new house after the war, or help us retire some day. And we don't have taxes after the war that practically strangle us.

Maybe, doing this sounds as if it isn't fun. But being shot at up at the front isn't fun, either. You have a duty to those soldiers as well as to yourself. You *can't* let the money that's burning a hole in your pocket start setting the country on fire.

★ ★ ★

This advertisement, prepared by the War Advertising Council, is contributed by this Magazine in co-operation with the Magazine Publishers of America.

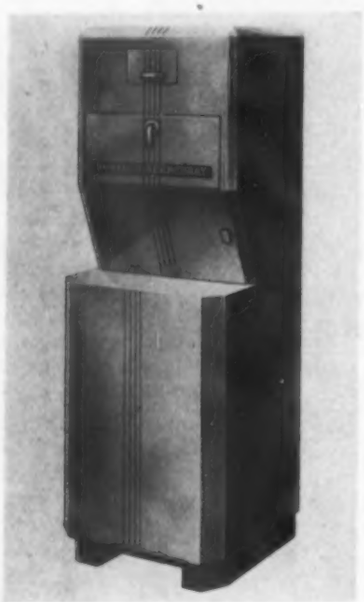
KEEP PRICES DOWN!

Use it up
Wear it out
Make it do
Or do without

NEW EQUIPMENT

Electronic Searchray Unit

A simple, compact x-ray unit, suitable for the internal inspection of rubber, plastics, ceramics, light alloys, and other materials, has been introduced under the name of the Electronic Searchray by the Industrial Electronics Division, North American Philips Co., Inc., 419 Fourth Ave., New York City. The device, which



Norelco Electronic Searchray

can be operated safely by unskilled personnel for any condition for which x-ray inspection is desired, is both fluoroscopic and radiographic in action.

No elaborate or expensive tools are needed for the operation or installation of the new x-ray unit, since there is no intricate system of dials or controls to adjust. The operator simply plugs into any standard 110-volt power supply, places the object to be examined in the compartment, closes the door and presses a button. The object can then be instantly seen fluoroscopically through the eye-level eye-piece. Safety for the operator is assured by a rayproof, shockproof housing with full automatic electric interlocks which interrupt the circuit while the compartment door is open.

Searchray is supplied with accessories which permit radiographic examination covering a maximum area of 11 x 14 inches using standard 12 x 14-inch x-ray film or paper. The article compartment is 21 inches long by 18 inches deep by 9 inches high. The fluoroscopic screen measures 12 x 16 inches with 8½ x 11½ inches being the maximum area observable at any one time. The entire unit is approximately 69 inches high by 26½ inches wide by 24 inches deep. It weighs approximately 425 pounds and takes up less than 5 square feet of floor space.

This Tribute

to the men of the Synthetic Rubber Industry appears in

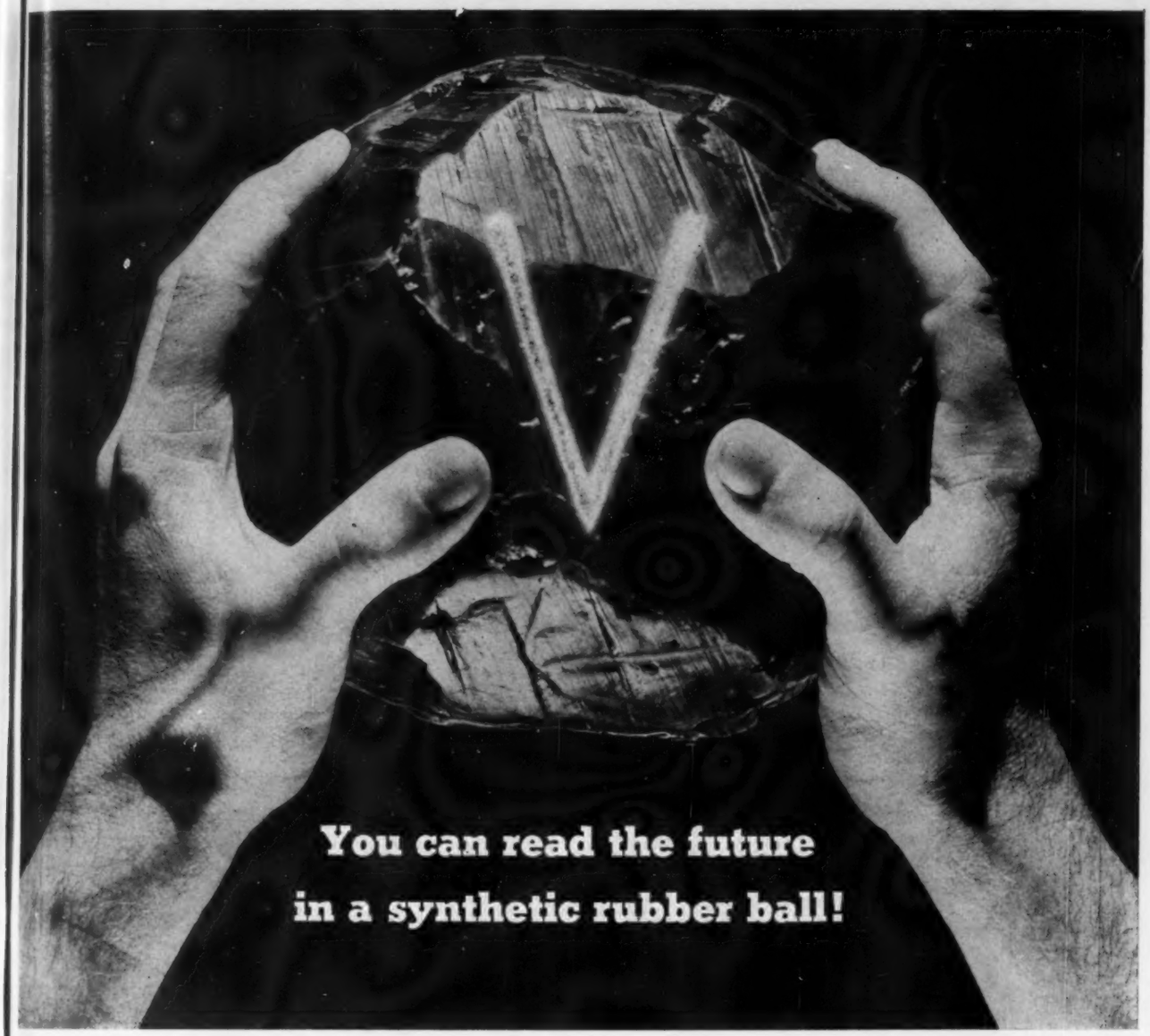
Time, Fortune, The Wall Street Journal and The Chicago Journal of Commerce

We, who know so well your magnificent accomplishments in peace as in war, are gratified to tell millions of Americans about the work of the Synthetic Rubber Industry.

GENERAL AMERICAN TRANSPORTATION CORPORATION

Chicago

BUILDERS AND SUPPLIERS OF RAILROAD FREIGHT CARS



Hold a small synthetic rubber ball proudly in your hand. It represents the farsighted planning of American businessmen—and their ability to *wage war.*

It tells of American scientific genius—of American workers' ability to accomplish the impossible . . . Factories speedily completed . . . Tonnage of synthetic rubber ahead of schedule . . . One of Japan's great hopes *blasted.*

General American Transportation has first-hand knowledge of the Synthetic Rubber Industry. Our Plate and Welding Division has made steel pressure vessels needed in a hurry. Specialized tank cars with the GATX mark have speeded highly volatile, hard-to-handle chemicals. These cars are part of a fleet of 55,000 now aiding the railroads in their tremendous wartime work.

GATX
GENERAL AMERICAN

A SYMBOL OF INTEGRITY FOR OVER 40 YEARS

GENERAL AMERICAN TRANSPORTATION CORPORATION

Chicago

BUILDERS AND SUPPLIERS OF RAILROAD FREIGHT CARS

RUBBER
★
SYNTHETIC RUBBER
★
PLASTICS

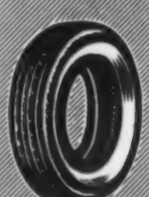
THE Schuster
MAGNETIC CALENDER GAUGE
SAVES THAT MATERIAL

For upwards of 15 years, the Schuster Magnetic Calender Gauge has unerringly set rubber calender rolls to a predetermined thickness and correctly maintained that thickness. It has saved the time of hand-miking, eliminated human error, saved the stock sampled for calender tests, and assured uniform thickness in the finished product.

All this, *at the right time—before* damage is done. And *continuously*—the only way worth while.

The instrument is simple in design . . . rugged in construction . . . practically without wearing parts . . . adjustable to any thickness. Originally used for rubber, it has taken over just as deftly for synthetic rubber, plastics, cellulose, and other media. No matter what the article, your coating must be thick enough, but not even 1/1000" too thick, or the war effort suffers irreparable loss. No matter what the material, you've got to s-t-r-e-t-c-h it as far as possible—and "possible" daily proves to have a new, elastic meaning.

Better investigate the Schuster Magnetic Calender Gauge at once, with or without automatic control. Every installation has to be engineered to the job . . . Please *give us time to do it right.*

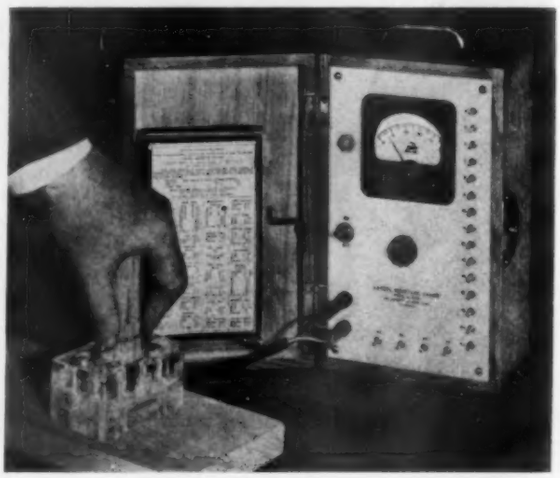


Ask for our bulletin on the Schuster Magnetic Gauge.

THE MAGNETIC GAUGE COMPANY
60 EAST BARTGES STREET AKRON, OHIO
Eastern States Representative—
BLACK ROCK MANUFACTURING CO., Bridgeport, Conn.

Kaydel Moisture Gauge

The moisture content of a number of materials, including rubber, plastic, paper, wood and cellophane, may be accurately determined with the use of the Kaydel Moisture Gauge and the Kaydel Pressure Contactor, both products of Hart Moisture Gauges, Inc., 126 Liberty St., New York 6, N. Y. The moisture



gauge was originally developed to determine the moisture content of any material by measuring the electrical resistance of that material, since the electrical properties vary tremendously with the moisture content present.

In operation, the contacting device, which is a small block of transparent plastic topped by a handle and equipped with electrodes on its underside, is touched to the surface of the material to be tested, thus causing an electrical penetration. The material in this manner is left unmarred and is in no way damaged. If the presence of moisture is indicated on the microammeter in the gauge, the material is then compared to a series of calibrated standards built into the circuit until the proper standard is found which is equal in electrical conductivity to the material. The standards are marked in terms of moisture per cent on the panel of the gauge and are easily readable.

What might be termed a fully comparative method is used in making the determinations. In connection with thicknesses of material over 3/8-inch the company furnishes a 4-pin and a 10-pin penetrating contactor. These are used on materials which require deep penetration to obtain the moisture reading. The gauge is designed to determine moisture content in ranges from 3 to 102 per cent.

Thermex High Frequency Heating Equipment

Practically any non-metallic material can be heated uniformly throughout and in minutes where it ordinarily takes hours with the new Thermex High Frequency Heating Equipment, according to the manufacturer of this equipment, the Girdler Corporation, Louisville, Kentucky.

Heating is accomplished within the article or molecule itself by reason of its molecular resistance to the high voltage, high frequency current passed through it

Three types of CALCINED MAGNESIA for neoprene

WHITTAKER
ESTABLISHED 1890

These three types of calcined magnesia meet requirements of quality and cost:

- **LIGHT**—The highest type. For the most exacting compounds. Fine particle size. Low moisture and carbonate content.
- **MEDIUM**—For less exacting requirements and where costs must be kept down. Fine particle size and low moisture content.
- **HEAVY**—Meets low cost need where high type compounding is not essential.

Samples, prices and additional information on request

WHITTAKER, CLARK & DANIELS, Inc.
260 West Broadway, New York City · Plant, South Kearney, N. J.
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Toronto: Richardson Agencies, Ltd.
Cleveland: Palmer Schuster Company

3343

SULPHUR and CHEMICALS FOR THE RUBBER INDUSTRY

CRYSTEX insoluble SULPHUR

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure
Refined Rubbermakers' Sulphur, Tube Brand, 100% Pure
Carbon Tetrachloride, **Carbon Bisulphide**
Caustic Soda, **Sulphur Chloride**

Stauffer CHEMICALS SINCE 1885

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555 SO. FLOWER ST., LOS ANGELES 13, CAL.
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NORTH PORTLAND, OREGON
APOPKA, FLORIDA

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Dibenzyl Ether

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to impart

- HIGH REBOUND ELASTICITY
- LOW-TEMPERATURE FLEXIBILITY
- LOW PERMANENT SET

for samples and prices
write to

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245 Fifth Avenue · New York 16, N. Y.

CONTINENTAL MACHINERY CO.
305 BROADWAY - - NEW YORK, N. Y.

•

Designers and Manufacturers of

RUBBER PLANT EQUIPMENT

- All types of Rubber Machinery and Plant Equipment for every requirement of Large and Small Factories.
- Complete Plant Design and Layout; also Special Machinery Developed and Manufactured.
- Specialists in Latex Equipment.
- Complete Laboratory Facilities for Chemical and Product Development and Research.
- Technicians Furnished for Factory Design and Operation in all countries.

Cable Address
"Contimac" New York

COMCO

Telephone
WOrth 2-1650

from flat electrode plates covering opposite sides or top and bottom of the mass to be heated. All coils, tubes, controls, etc., are housed with a compact safety cabinet, certain models of which are portable and mounted on casters. Any average workman can be trained to operate the largest units, simplest units have single-knob control. Equipment is extremely efficient in its transformation of electric current energy into heat energy, improves quality of product, increases production, simplifies auxiliary equipment and saves floor space.

Already established in the wood-working or wood-fabricating field, where it is said to be revolutionizing the processing of plywoods and laminated woods used in airplane and ship construction, other applications include cellulose, paper, textiles, powders, felts, woolens, cottons, ceramics, clays, oxides, tobaccos, plastics, rubber, cork, glue, etc. Extensive laboratory facilities are available for making test applications under simulated operating conditions, and large production facilities exist for manufacture.

Henszey Flow Indicator

The Henszey Flow Indicator, product of the Henszey Co., Watertown, Wisconsin, has recently been improved. The improved model, developed to accurately indicate the rate of flow of hot dirty blowdown from steam boilers, is said to be ideally adaptable for indicating the rate of flow of liquids, such as boiler feed water, condensate, gasoline, light oils, chemicals, etc. It registers within 3% of absolute accuracy, maintaining such accuracy for long periods. It shows the rate of flow at any instant and if the flow is pulsating it tends to indicate it exactly as it occurs. The instrument indicates flow over its entire range from zero to 100%, the graduations on the dial being uniformly spaced from one end to the other.

In operation, the water enters the indicator below the plunger and forces the plunger upward off its seat. This exposes slots on the side of the plunger, through which the water passes. An increase in flow will increase the lift of the plunger and expose a greater area of slots. The slots are proportioned so that the lift of the plunger is in proportion to the rate of flow of water. When no water is flowing the plunger rests on its seat, and the openings through the meter are entirely closed. The slightest flow of water must lift the plunger in order to pass through, therefore the pointer indicates on the scale even the smallest flows.

The Baker Industrial Truck Division of the Baker-Rauland Co., Cleveland, Ohio, has introduced a new 4,000-pound capacity **Low-Lift Truck,** known as Type E-2. The new truck was designed to give longer hours of uninterrupted operation and to provide greater safety of operation through better vision.

A **new badge unit** that is re-usable and tamper-proof, designed to drastically cut the cost of operating an identification system, save time, and eliminate needless waste of material, has been developed by the American Emblem Co., Inc., Utica, N. Y. Changes of photographs and color designations can be accomplished only with a special tool furnished by the company.

Mark Rubber and Synthetic Products with

KAUMAGRAPH

Dry

Transfers

Reproduce trade-marks or lettering on your product for attractive, safe, economical identification. The research and experience of over 40 years in supplying identification for textiles, rubberized fabrics, artificial leather and other products is at your disposal.

Send a sample of your product and we will show you how Kaumagraph Dry Transfers can mark it.

KAUMAGRAPH
Wilmington, Delaware

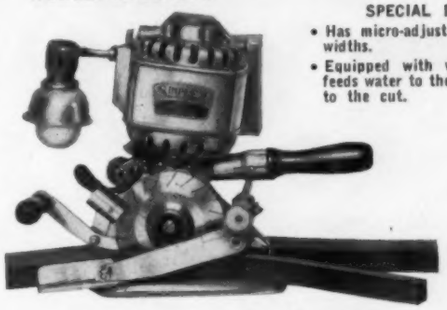
IDENTIFICATION HEADQUARTERS SINCE 1902

SIMPLEX
REG. TRADE MARK

RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
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Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Can be used to trim conveyor belts, cut sponge, pure gum, uncured stocks, etc. Cuts squarely—no rejects.

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Time Tested Properties

Known aging qualities
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Aid to mechanical processing operations
Ease of dispersion and processing
Plasticizing action
Aid to maintaining fixed hardness
Non-thermoplastic nature

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1903
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Westinghouse Mot-O-Trol Drive

Mot-O-Trol, a new electronic adjustable-speed drive, for application on industrial drives, such as machine tool feeds, winding reels, conveyors, and fabricating and converting machinery in general, has been announced by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna. It provides close speed regulation over a 20 to 1 speed range for D.C. motors operating from an A.C. source.

Features of the electronic drive include stepless speed control, automatic close speed regulation over wide load fluctuations, full torque at extremely low speeds, smooth stepless acceleration and deceleration and dynamic braking. At present, a standard drive is available for ratings up to 1 horsepower for single phase operation on 110 or 220 volt, 60-cycle systems. Special drives of larger horsepower rating can be designed to suit particular application requirements.

This new drive has 4 parts. These are (1) power transformer for separate mounting, (2) Mot-O-Trol cabinet with the thyratron-tubes and the current limiting and speed regulating control, (3) control station with potentiometer to vary the voltage supplied to the armature and field circuits and with start and stop push buttons, and (4) shunt-wound, d-c motor.

BRIEFS . . . .

Titeflex Metal Hose Co., Newark, N. J., has issued a new catalog dealing with the general industrial applications of its **line of flexible metallic tubing.** Types used in the conveyance of oil, gases and liquids are described. Ask for Catalog No. 113.

•

Procedures in the supervisory field which management can follow in order to build sound management-supervisory relations are outlined in a 16-page booklet entitled **The Foreman—Key Man in Your Plant,** issued by the National Association of Manufacturers, 14 West 49th St., New York City.

•

A pamphlet summarizing a number of the proposals being made currently in the United States, and in some of the other United Nations, for international economic action related to the terms of the peace and to the economics of the post-war period has been made available under the title **Summary of Various Current Proposals for Post-War International Economic Action** by the Foreign Commerce Department, Chamber of Commerce of the United States, Washington, D. C.

•

A new catalog on **Micromax Pneumatic Control** (Catalog N-OOB), which stresses the use of this equipment for regulation of pH, conductivity and other conditions, as well as temperature, has been issued by the Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Penna.

•

Data on three new types of **mechanical-drive turbines** (Bulletin GEA-1145-D) is provided by the General Electric Co., Schenectady, N. Y. These turbines are designed to drive general purpose equipment in industrial plants and auxiliaries in power houses.

•

A brief account of the kinds of technical problems presented to the company, and their solution, is given in **Wartime Engineering,** issued by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna.

The New Word, Sir, is Synthetic!

"Synthetic" means artificial, and the only thing artificial about the future of the American rubber industry is the new raw material itself.

Altho our wartime engagement has been the manufacture of precision gages, tools, and molds for war production, we've kept our knowledge and our thinking abreast of the technical developments in the rubber field. For we are, in the final analysis, still rubber technologists, and our long experience as engineers to the rubber industry has given us special ability along constructive lines.

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2. Calcene in Reclaim Stocks. No. 43-2.

3. Silene and Silene EF in Natural Rubber. No. 43-3.

4. Calcene T in GR-S—Plasticized with p-Coumarone Indene Resin. No. 43-4.

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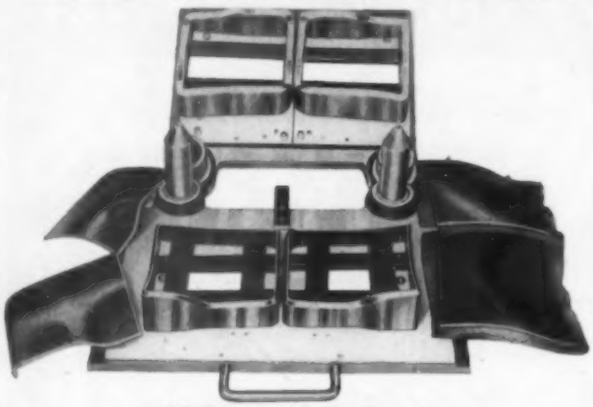

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REVIEWS

BOOKS

Handbook of Plastics. By Herbert R. Simonds and Carleton Ellis. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 6½ x 9¼ in. 1082 pp. $10.00.

(Available from Book Department, RUBBER AGE*)*

The essential facts and figures of the entire plastics industry, still growing by leaps and bounds, are included in this monumental handbook. It presents exhaustively and yet with proper selection the fundamental basis and technology of the industry, covering fully the present state of the field, the physical and chemical properties of plastics, their production, manufacture and finishing, and, as stated in the preface, "all of the useful information which anyone working with plastics should find in a well organized and thorough treatment of the subject."

The book is divided into nine sections, each section being subdivided into numerous headings. The sections are: (1) Introduction; (2) Physical Properties of Plastics; (3) Materials; (4) Manufacture of Plastics; (5) Processing and Fabrication; (6) Chemistry of Plastics; (7) Application of Plastics; (8) Commercial Considerations; (9) Appendix, Glossary, Bibliography. There are numerous illustrations, schematic drawings, flow charts, etc., and 129 tables. In addition, there is a carefully cross-referenced general index.

Because the border-line between rubber and plastics grows closer with each new discovery, it is natural that references to rubber of all types—natural, crude, reclaimed, synthetic and derivatives—crop up throughout this handbook. A complete chapter, however, is devoted to "Synthetic Rubbers and Elastomers." Classifying these rubbers into thermoplastic and thermosetting (or curing) types, the authors briefly discuss the various types, including the bunas, butyl rubber, neoprene and Thiokol. A table showing the chemical structure of varieties of synthetic rubber and another giving the properties of various substances of rubbery characteristics are included in this chapter. Some examples of rubber-synthetic mixtures are discussed.

Collection of material for inclusion in this handbook was started by Mr. Simonds and Mr. Ellis early in 1940. After the death of Mr. Ellis in January, 1942, the handbook was completed by Mr. Simonds, with the cooperation of Dr. H. M. Bigelow, now a captain in Chemical Warfare Service and formerly head of the technical service division of the Plaskon Co., Inc. The cooperation of a distinguished group of representative technical men was also enlisted. It is apparent from the wealth of information on plastics given by the handbook that all concerned did their work well.

•

The Microscope and Its Use. By F. J. Munoz and H. A. Charipper. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn, N. Y. 5½ x 8½ in. 334 pp. $2.50.

This is a practical reference book, written as a guide to aid technicians and students in the use of the microscope. It is written in clear, non-technical language, with all exhaustive and complete discussions of "optics" eliminated.

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Your Bond Selling Responsibilities Double!

Starting September 9th, your Government will conduct the greatest drive for dollars from individuals in the history of the world—the 3rd War Loan.

This money, to finance the invasion phase of the war, must come in large part from individuals on payrolls.

Right here's where YOUR bond selling responsibilities DOUBLE!

For this extra money must be raised *in addition* to keeping the already established Pay Roll Allotment Plan steadily climbing. At the same time, every individual on Pay Roll Allotment must be urged to dig deep into his pocket to buy *extra* bonds, in order to play his full part in the 3rd War Loan.

Your now *doubled duties* call for these two steps:

1. If you are in charge of your Pay Roll Plan, check up on it at once—or see that whoever is in charge, does so. See that it is hitting on all cylinders—*and keep it climbing!* Sharply increased Pay Roll percentages are the best warranty of sufficient post war purchasing power to keep the nation's plants (*and yours*) busy.

2. In the 3rd War Loan, every individual on the Pay Roll Plan will be asked to put an *extra two weeks salary* into War Bonds—over and above his regular allotment. Appoint yourself as one of the salesmen—and see that this sales force has every opportunity to do a real selling job. The sale of these *extra* bonds cuts the inflationary gap and builds added post-war purchasing power.

Financing this war is a tremendous task—but 130,000,000 Americans are going to see it through 100%! This is their own best *individual* opportunity to share in winning the war. The more frequently and more intelligently this sales story is told, the better the average citizen can be made to understand the wisdom of turning every available loose dollar into the finest and safest investment in the world—United States War Bonds.

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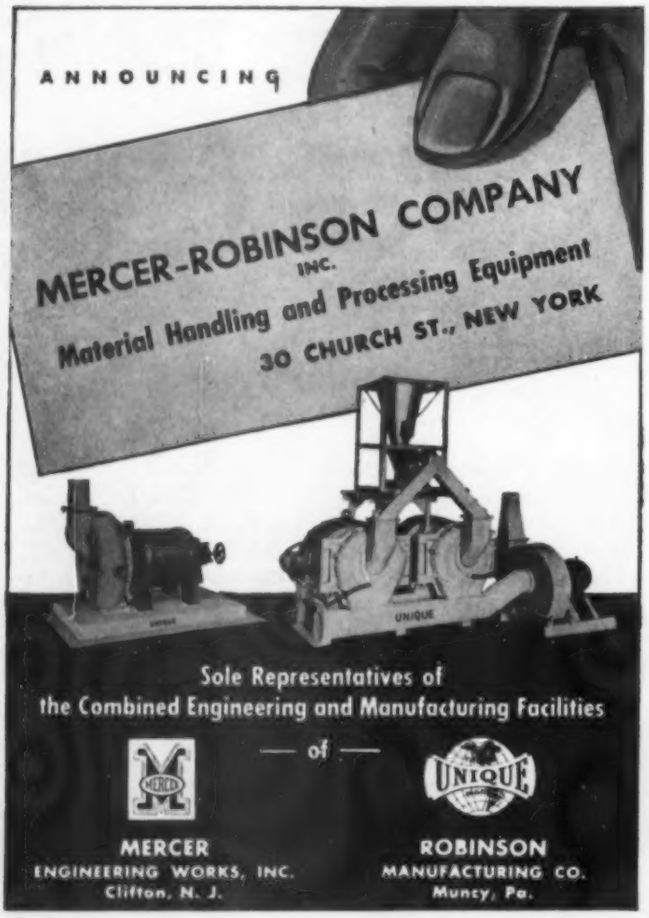

since they are readily available, to those interested, in the more complete textbooks on the microscope or physics. Actual examples of the use of the microscope, not only for the biological sciences but also for metallurgy, geology, ballistics, etc., are incorporated. A comprehensive glossary covering definitions of words and terms commonly used in relation to the microscope is included. The book should prove of value to all laboratory workers.

BOOKLETS, CATALOGS, Etc.

The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. IV. The Isolation and Constitution of Photochemically-Formed Methyl Oleate Peroxide. V. Observations on Fish-Oil Acids. By E. H. Farmer and D. A. Sutton. (Publication No. 31). British Rubber Producers' Research Association, 19 Fenchurch St, London, E. C. 3, England. 7¼ x 9¾ in. 12 pp.

Methyl oleate absorbs oxygen readily at 35° to give a peroxide which can be isolated, but not completely freed from other substances, by continuous molecular distillation of the product. This somewhat impure peroxide consists mainly of mono-hydroperoxide, but contains a little di-hydroperoxide together with some peroxide transformation product. The mono-hydroperoxide retains the olefinic unsaturation of the oleic ester intact and can be hydrogenated to give methyl hydroxystearate or reduced by aluminum amalgam to give methyl hydroxyoleate. The methods are described in Part IV. As indicated by the title, Part V covers the observation of fish-oil acids, spectroscopic examination of autoxidized methyl docosahexaenoate revealing an intensity of absorption considerably greater than that of the original ester. Both parts are reprints of material originally appearing in the *Journal of the Chemical Society.*

•

The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. VI. The Peroxidation of Rubber. By E. H. Farmer and A. Sundralingam. (Publication No. 32.) British Rubber Producers' Research Association, 19 Fenchurch St., London, E. C. 3, England. 7¼ x 9¾ in. 12 pp.

The results of a special study on the course of reaction in the autoxidation of rubber, principally under photochemical conditions, are reported in this bulletin. In ultra-violet light high yields of peroxide are formed in the very early stages of oxygen absorption, but soon decay reactions set in so that the ratio of the perodixic oxygen content to the oxygen intake decreases rapidly. The secondary products are hydroxylated compounds. The consumption of oxygen in relation to the degree of degradation produced is discussed. The material is reproduced from the *Journal of the Chemical Society.*

•

Planning and Organizing a Morale Program. Stimulating and Maintaining Employee Morale. Reducing Absenteeism through Employee Education. Issued by Policyholders Service Bureau, Metropolitan Life Insurance Co., New York 10, N. Y. Each 8¼ x 10¾ in.

These three reports represent a trilogy of studies on current methods of impressing employees with the importance of their home front role in the war effort, the title of each report accurately conveying the nature of the contents. The studies represent the findings of a review of literally hundreds of effective morale programs, anti-absenteeism campaigns, employee magazines, and production campaigns, as submitted by wartime industries interested in an exchange of ideas on the subject. The reports are liberally illustrated and documented.

A Survey of the Literature on Synthetic Rubber, with Special Reference to Its History, Raw Materials Employed and Its Commercial Production. By Ellis I. Fulmer. Published as a Contribution from the Iowa Corn Research Institute by the Iowa Agricultural Experiment Station, Ames, Iowa. 7 x 10 in. 62 pp. 15c.

A summary of the scientific literature on synthetic rubber, with special emphasis upon its history, the raw materials employed in its manufacture, and data on its commercial production in various countries is contained in this bulletin. The references chosen, while far from exhaustive, furnish a typical and fairly adequate cross-section of the subject of synthetic rubber. The material is arranged chronologically, with annotations and cross-references included. An appended list of references includes not only the articles reviewed, but also the literature cited. The author, Dr. Fulmer, is associated with the Department of Chemistry of Iowa State College.

•

Suprex Clay in Buna S: General Compounding Characteristics. (Bulletin No. 3). J. M. Huber, Inc., 460 West 34th Street, New York, N. Y. 8½ x 11 in. 9 pp.

As indicated by the title this bulletin, the third in a series prepared by Huber, based upon laboratory experiments, covers the general compounding characteristics of Suprex Clay in Buna S. Tables showing the effect of sulfur concentration and of accelerator concentration on a Buna S compound loaded with Suprex Clay are included, as well as tables showing the effect of sulfur concentration on Geer oven aging characteristics of a similar compound, a comparison of Suprex Clay vs. soft clay over a range of loadings in a Buna S compound, a comparison of representative softeners in the compound, and a comparison of representative accelerators. Conditions of testing are described.

•

The Family of Monsanto Plastics. Monsanto Chemical Co., St. Louis, Mo. 8½ x 11 in. 24 pp.

Although primarily intended as a guide for product designers, this highly colorful booklet also gives the complete stranger to plastics a clear picture of what plastics are, how they are used, and what they may logically be expected to accomplish, now and in the predictable future. Included are diagrams illustrating how plastics are molded, charts comparing the characteristics of principal basic types, photographs of typical war and pre-war uses, and diagrams explaining some of the latest advances in plastics fabricating technique which are most likely to affect strongly the shape of things to come. Some interesting information on Saflex, the rubber-like vinyl acetal resin which has replaced rubber in many applications, is included.

•

The Story of Chemigum. Goodyear Tire & Rubber Co., Akron, Ohio. 5 x 7 in. 26 pp.

This booklet traces the development of Chemigum, discusses its manufacture, talks of its cost, and describes some of its present and future applications. Its physical properties in comparison with those of crude rubber are outlined in table form. The booklet is not intended as a technical treatise on Chemigum, but was designed for the layman to acquaint him with the material and its potentialities.

•

Edge Moor Horizontal Mixers and Blenders. (Bulletin 117.) Edge Moor Iron Works, Edge Moor, Delaware. 8½ x 11 in. 4 pp.

The various types of horizontal mixers and blenders made by the company, which find application in the chemical and processing industries, are described and illustrated in this new folder. Specifications are furnished, with specific advantages stressed.

CONTINENTAL-MEXICAN RUBBER CO., Inc.
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CUTTING AND PERFORATING DIES

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New and Better
GAMMETER'S
ALL STEEL ALL WELDED
CALENDER STOCK SHELL

4" - 5" - 6" - 8" - 10" - 12" diameters, any length.

Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

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MAGNETS - All Kinds

Stearns Improved Air Cooled Magnetic Pulley

Stearns magnetic clutches and brakes offer smooth, efficient operation with near or remote control. Bulletin 225.

Processing scrap rubber requires Stearns Magnetic pulleys or other types of magnetic separators. For economical, automatic, efficient protection against costly shutdowns due to tramp iron damage, Stearns Magnetic equipment will pay for itself many times over—a definitely profitable investment.

WRITE FOR BULLETIN 302

STEARNS MAGNETIC MFG. CO.
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No substitute for testing

Rubber products manufacturers are successfully employing an amazing range of substitutes—but there's no substitute for Adequate Testing by *Scott Testers. Our 60 models test for tensile, hysteresis, state-of-cure, compression cutting, plasticity, adhesion, light aging, etc., etc.

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Red Iron Oxides
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• ATTRACTIVE
• NON-DETERIORATING

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BELLEVILLE, N. J.

REVIEWS (CONT'D)

Prevention of Butadiene-Air Explosions by Addition of Nitrogen and Carbon Dioxide. By G. W. Jones and R. E. Kennedy. Issued by Bureau of Mines, Department of the Interior, Washington, D. C. 8 x 10½ in. 11 pp.

As indicated by the title, this report covers experiments conducted to aid in preventing explosions of butadiene and air mixtures. It contains tables and graphs showing how much nitrogen and carbon dioxide must be added to make varying mixtures of butadiene and air non-explosive. Newly-developed testing procedures and apparatus, especially applicable for butadiene, air, nitrogen and carbon dioxide mixtures, were used for the experiments, the percentage proportions of the gases being determined by partial pressure methods. Summarizing the results, the authors state that if nitrogen is used to dilute the mixture, at least 19.6 volumes must be added to each volume of butadiene to render all mixtures non-inflammable with air. Only 12.1 volumes of carbon dioxide are required under similar conditions.

•

Naval Stores and the Compounding of Synthetic Rubber. Hercules Powder Co., Wilmington, Delaware. 8½ x 11 in. 12 pp.

This is a preliminary report on the use of various chemical products from pine wood (naval stores) as softeners and tackifiers in the compounding of synthetic rubber. Products discussed include Staybelite resin, Poly-pale resin, Belro resin, and a few special new resinous materials developed by the company. Tables give properties and comparative values in a typical GR-S tread stock of several naval stores chemicals. The comparative values cover tack, plasticity, resilience, compression set, tear test, heat build-up, flex cracking, and elongation.

•

Statex B. (Bulletin No. 126). Binney & Smith Co., 41 East 42nd St., New York, N. Y. 8½ x 11 in. 2 pp.

Some data indicating that with Statex B, a reinforcing carbon, it is possible to produce a reinforced stock of given hardness with less polymer and yet develop improved resilience is furnished in this technical bulletin. It is explained that whereas Statex A is controlled for electrical conductivity and presents a surface of 8.5 acres per pound, Statex B, the new carbon, is slightly coarser, having a surface of approximately 8.0 acres per pound, and is controlled from the point of view of GR-S tire compounding with special reference to low hysteresis and low heat build-up.

•

Chemical Warfare and the Chemical Warfare Service. Published by the Chemical Warfare Service, Washington, D. C. 8 x 10½ in. 40 pp.

Intended primarily for the use of individuals outside the armed forces, this booklet provides the answers to many questions that might be asked by the layman and furnishes a definite picture of chemical warfare and the Chemical Warfare Service. Numerous illustrations are used to clarify the text. For the convenience of those desiring further information, a bibliography of publications on chemical warfare is included.

•

GR-S and GR-I in Proofing. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 8½ x 11¼ in. 8 pp.

Whereas previous study has been largely devoted to the use of hard and soft blacks as fillers and reinforcing agents for GR-S (Buna S) and GR-I (butyl rubber), this laboratory report concerns preliminary laboratory work and observations on the compounding, processing and curing of GR-S and GR-I in light-colored stocks for the proofing industry. The tensile properties, with press cures and dry heat cures, and the Shore hardness of several typical compounds are given. Specific recommendations are made.

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

Crude Rubber

MEXICO, now in search of natural rubber to supply her own manufacturing industry, looks hopefully to the creation of a plantation industry to cover her own needs and provide a surplus for export to the United States, according to a recent report by the Office of the Coordinator of Inter-American Affairs. Tire and other rubber factories in Mexico are said to require about 4,500 tons of crude rubber annually, most of which was formerly secured from the Far East, although the tropical areas of southern Mexico are considered well suited for growing rubber trees.

It is pointed out, however, that Mexico has the beginnings of a plantation industry, her experimental efforts in this direction being aided by the U. S. Department of Agriculture which has provided seeds for high-yielding trees. Near El Palmar, in the state of Santa Cruz, the government has the nucleus of a plantation industry, with more than 2,500,000 young rubber trees. These trees, it is calculated, may provide the basis for production of 12,000 to 15,000 tons of rubber annually. The remnants of old plantations established in Mexico many years ago are also yielding a little rubber.

Progress is also reported from other Latin American countries. Peru, for example, reports that a health dispensary has already been set up in the primitive Madre de Dios regions, a promising rubber-producing country, and efforts have been launched on collecting the wild rubber. Brazil's scrap rubber drive, which ended officially on July 15, is still continuing, with school children turning in over 200 tons in Rio alone and 300 tons more in Sao Paulo.

Prices shown below are those set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21¼	38⅝
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12⅝	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C, for Civilian Use; N-C, for Non-Civilian Use.

NEW YORK, Aug. 11, 1943

Scrap Rubber

The demand for scrap rubber continues at the same high level witnessed in recent months, but fortunately the supply is still plentiful as the result of the last nation-wide scrap rubber campaign and the turning in of unserviceable tires during the Idle Tire Return Plan. In addition, some military tires, worn beyond the point of possible repair, are also believed to be finding their way into regular trade channels. A slow trickle of synthetic rubber scrap is now evident and plans are being made to sort and grade this type of scrap, since the current trickle is expected to develop into a steady stream in the next few years. Dealers anticipate no special difficulty in handling synthetic rubber scrap. Prices shown below are ceilings on typical grades of scrap rubber:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.818
40x40	36 in.	6.15	lb.	—	@ 6.991
40x36	36 in.	6.50	lb.	—	@ 6.615
48x48	40 in.	2.50	lb.	—	@16.200
48x48	40 in.	2.85	lb.	—	@14.210
56x60	40 in.	3.60	lb.	—	@11.944
48x44	40 in.	3.75	lb.	—	@11.066

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton of 20.37c at the ten designated southern markets.

Cotton

The cotton market has been lethargic in recent weeks, the price for middling uplands on the Exchange swinging in the narrow range of 48 points since our last report. High for the period was 21.58 on July 14 and low 21.10 on July 31. The average price of middling uplands for the month of July was 21.47, based on 26 trading days. At no time during the period did the market show any appreciable strength, war news and general confusion tending to keep the price at the lower levels. Hedging was apparent all through the period, such action being presumed to be either against loan repossessions or movement of new crop cotton in the South and Southwest. There has been some evidence of a strengthening market in the past ten days, but the trade is moving cautiously pending developments in the price control policies of the Administration. The Department of Agriculture has forecast a slightly smaller cotton crop for 1943 than in 1942, but visualizes a record average yield of 279.4 pounds per acre. A crop of 12,558,000 bales, 2.1% below the 1942 production, was the estimate advanced by the Crop Reporting Board on August 9. Quotations for middling uplands on the Exchange follow:

	July 13	August 11		
	Close	High	Low	Close
October	20.13	20.04	19.99	20.00
December	19.96	19.93	19.87	19.87
March	....	19.77	19.74	19.72

Reclaimed Rubber

Reclaimers report no lessening in the demand for reclaimed rubber. In fact, the trade anticipates still greater demand in the immediate future, particularly for grades suitable for the production of camelback. Although new tires will be made available to essential motorists next year, under the program of the Office of the Rubber Director, all government agencies affiliated with the transportation problem are warning all motorists to check their present tires carefully so that they can be recapped before they become too badly worn. As a result of such warnings, and special programs being carried out by such agencies as the Petroleum War Industry Council, an increased demand for camelback is expected, most of which will be met with reclaimed camelback. Prices shown below are ceilings on typical grades of reclaim:

Shoe				
Unwashed	lb.	.07	@	.07¼
Tube				
Black Tube	lb.	.11¼ @		.11½
Red Tube	lb.	.12	@	.12¼
Tires				
Black (acid process)	lb.	.07½ @		.07¾
Black, selected tires	lb	.06½ @		.06¾
Truck, Heavy Gravity	lb.	.08½ @		.08¾
Miscellaneous				
Mechanical blends	lb.	.04½ @		.05½
White	lb.	.13	@	.13¼

Ducks

Enameling (single filling)	lb.	—	@	.44¼
Belting and Hose	lb.	—	@	.39
Single filling, A grade	lb.	—	@	.19¼
Double filling, A grade	lb.	—	@	.20¾

CHEMICAL MARKETS

New York, Aug. 11, 1943
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28 @	.33
A-10	lb.	.36 @	42
A-19	lb.	.52 @	.65
A-32	lb.	.60 @	.70
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.43 @	.45
Beutene	lb.	.59 @	.64
B-J-F	lb.	.38 @	.43
Butyl Zimate	lb.	— @	1.13
Captax	lb.	.38 @	.40
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.40 @	.47
Ethyl Zimate	lb.	— @	1.13
Ethylidine aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.34 @	.39
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Ledate	lb.	— @	1.48
Methyl Tuads	lb.	— @	1.53
Methyl Zimate	lb.	— @	1.23
Monex	lb.	— @	1.53
Pentex	lb.	.74 @	.84
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.65
R & R 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	1.55 @	1.70
Rotax	lb.	.48 @	.50
Safex	lb.	1.15 @	1.25
Santocure	lb.	.60 @	.67
Selenac	lb.	— @	1.98
SPDX	lb.	.70 @	.75
Super-Sulfur No. 2	lb.	.13 @	.15
Thiocarbanilid, drums	lb.	.28 @	.33
Thiurad	lb.	— @	1.55
Trimene	lb.	.54 @	.64
base	lb.	1.03 @	1.18
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.50 @	.75
Blend B	lb.	.50 @	.57
Blend C	lb.	.48 @	.55
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.17 @	.27
Browns [b]			
Mapico	lb.	.1135@	—
Umber, Turkey	lb.	.04¼ @	—
Greens [b]			
Chrome	lb.	— @	.25
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¼ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.096 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites [b]			
Cryptone No. 19	lb.	.0560@	.0585
Cryptone CB No. 21	lb.	.0560@	.0585
Cryptone ZS-800	lb.	.0825@	.0850
Lithopone:			
Albalith	lb.	.04¼ @	.04½
Astrolith	lb.	.04¼ @	.04½
Azolith	lb.	.04¼ @	.04½
Ray-cal	lb.	.05¼ @	.05¼
Rayox	lb.	.14½ @	.15¼
Titanox A	lb.	.14½ @	.14¾
Titanox B	lb.	.05¾ @	.06
Titanox C	lb.	.05½ @	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼ @	.07½
Anaconda, lead free	lb.	.07¼ @	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼ @	.07½
XX Red—4	lb.	.07¼ @	.07½
XX Red—72	lb.	.07¼ @	.07½
XX Red—103	lb.	.07¼ @	.07½
Kadox, black label—15	lb.	.07¼ @	.07½
Red label—17	lb.	.07¼ @	.07½
St. Joe, black label	lb.	.07¼ @	.07½
green label	lb.	.07¼ @	.07½
red label	lb.	.07¼ @	.07½
U. S. P.—7, bbls.	lb.	.10½ @	.10¾

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½ @	.09¾
Green seal—8	lb.	.09 @	.09½
Red seal—9	lb.	.08½ @	.08¾
Yellows [b]			
Cadmolith	lb.	.55 @	.60
Chrome	lb.	— @	.50
Mapico	lb.	.071 @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow		.0355@	—
Certified		.0355@	—
Certified Spheron		.0355@	—
Channel "S"		.12 @	—
Continental		.0355@	—
Disperso		.0355@	—
Dixiedensed		.0355@	—
Dixiedensed 66		.0355@	—
Excello		.0355@	—
Furnex		.03½ @	.06
Furnex Beads		.03½ @	.06
Gastex		.03½ @	.06
Kosmobile		.0355@	—
Kosmobile 66		.0355@	—
Kosmos-Dixie 20	lb.	.03½ @	.06
Micronex (Amarillo)		.0355@	—
Micronex Beads (Amarillo)		.0355@	—
Pelletex		.03½ @	.06
P-33		.0475@	—
Shell Carbon (Del. Midwest)		.0240@	—
Sterling		.035 @	—
Supreme		.0355@	—
Thermax		.0225@	—
Thermax "S"		.0675@	—
Wyex		.0355@	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	@24.50
99½%-300	ton	—	@16.50
86-90%-300	ton	—	@13.50
Asbestine	ton	16.50	@20.00
Atomite	ton	—	@27.50
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	25.35	@36.00
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	60.00	@67.50
Calcene	ton	37.50	@43.00
Catalpo (fact)	lb.	.02	@ —
Chalk, precipitated			
Suprex white	ton	32.50	@45.00
Clay, Aerfloted, Suprex	ton	10.00	@22.50
Aerfloted Paragon	ton	10.00	@22.50
Crown	ton	10.00	@ —
Dixie	ton	—	@10.00
Kaolloid	ton	—	@ 9.00
Langford	ton	—	@ 8.50
McNamee	ton	—	@10.00
Par	ton	—	@10.00
Witco	ton	10.00	@ —
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	—	@26.00
Kalite No. 3	ton	—	@36.00
Kalvan	ton	—	@100.00
Kalvan "S"	lb.	— @	.09½
Keystone white	ton	—	@14.00
Magnesium carbonate	lb.	.06¼ @	—
Mineralite	ton	—	@30.00
Pyrax A	ton	—	@ 7.50
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Rubberol	lb.	— @	.17½
Silene EF (calcium silicate)	lb.	.055 @	.06
Snowflake white	ton	—	@16.00
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Witco	ton	6.00	@ —
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	@ —
Black Diamond	ton	25.00	@ —
Hard Hydrocarbon	ton	25.00	@27.00
MilliMar	lb.	— @	.05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00 @	4.50
Rodo #10	lb.	5.00 @	5.50
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.34
Santomerse S	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.22¾ @	.27¾
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.50 @	.59
Ty-Ply	gal.	6.75 @	8.00
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38 @	3.63
Nitric, 36 degrees	cwt.	5.00 @	—
Acids, Fatty			
Laurex	lb.	.14¾ @	.17¼
SL #10	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearite	lb.	.10 @	—

Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.15 @	2.98
Oils			
Degras, bbls.	lb.	.10 @	.12
Para-Flux	gal.	.17 @	.18
Para-Lube	lb.	.046 @	.048
Petrolatum, amber [b]	lb.	.03⅜ @	—
Pigmentaroil ,tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Pine, tanks	gal.	.55 @	—
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	—
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	— @	4.50
Pigmentar, tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Retort Pine Tar, drums	gal.	.26½ @	.27½
Solvents			
Acetone, pure [a]	lb.	.07 @	—
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.05
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.83 @	1.27
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.48 @	.50
Ethylene dichloride	lb.	.07½ @	.08½
Plastogen	lb.	.07¾ @	.08
Reogen (drums)	lb.	.11½ @	.12
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09½
Turpentine, spirits	lb.	.78½ @	—
dest. dist., drums	gal.	.50 @	.55
Waxes			
Beeswax, white [b]	lb.	.58 @	—
Carnauba, yellow [b]	lb.	.83¼ @	—
Ceresin, white, dom.	lb.	.13½ @	.15
Montan, crude	lb.	— @	—
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼ @	—
Refined, 123/125	lb.	.05¼ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95 @	2.05
Gel	lb.	.52 @	.54
Hipar	lb.	.61 @	.63
Powder	lb.	.43 @	.45
Resin	lb.	.43 @	.45
Resin D	lb.	.43 @	.45
White	lb.	1.23 @	1.33
Albasan	lb.	.69 @	.74
Antox	lb.	.54 @	.56
B-L-E	lb.	.43 @	.52
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.43 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santoflex BX	lb.	.54 @	.64
Santovar O	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.43 @	.52

EXTENDERS

Naftolen	lb.	.15 @	.25
Vanzak	gal.	.05 @	.06

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	— @	1.35
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Sericite	ton	65.00 @	75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08½ @	.13
White	lb.	.09 @	.15
Brown	lb.	.10 @	.14
Neophax A	lb.	.16½ @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08 @	.12
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55 @	—
Commercial (bags)	cwt.	2.20 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials

ACCELERATOR Z 51
- Good Aging Properties
- Free from Rapid Overcure
- Safe Processing Properties
- Low Dosages for Optimum Cures

Advance Solvents & Chem. Corp.
245 Fifth Ave. New York, N. Y.

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; DPG; Pip Pip; A-10; A-32; A-46; A-100; R-2 Crystals • ANTIOXIDANTS—Flectol H, White; Santoflex B, BX; Santovar A.

MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 40 years.*

The Aluminum Flake Co.
Akron, Ohio

ALUMINUM HYDRATES
"Alorco" Hydrated Aluminas reinforcing pigments give many desirable properties to rubber. Send for sample.

ALUMINUM CO. OF AMERICA
1970 Gulf Bldg. Pittsburgh, Pa.

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.

Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

CALCENE—SILENE EF
Two exclusive Columbia pigments proving exceptionally valuable to Rubber Compounders. Send for free data sheets.
PITTSBURGH PLATE GLASS CO.
COLUMBIA CHEMICAL DIV.
Grant Bldg., Pittsburgh (19), Pa.

CARBON BLACK-MICRONEX
The world's standard gas black; universally known as the "King of Rubber Pigments."

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41 East 42nd St. New York City

CARBON BLACK
A Grade for Every Requirement
CONTINENTAL "AAA"—Low heat generating, extremely easy processing. "AA"—Low heat generating, easy processing. "A"—Medium cure, medium processing. "D"—Standard Channel Black.

Continental Carbon Company
295 Madison Ave., New York, N. Y.

CARBON BLACK—Aerfloted
WYEX — TX — HX
Compressed — Compact (Dustless)

J. M. Huber, Inc.
460 West 34th St. New York

CARBON BLACK
"Atlantic" Carbon Blacks meet the exacting standards of modern rubber production.

Chas. Eneu Johnson & Co., Mfrs.
Distributed by
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CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
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Then you should believe in telling the rubber industry about them. The MARKET PLACE is the logical place to display your wares.

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Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
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Cable Address: Jacobite Boston

CHEMICALS

For Rubber		For Industry Generally
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK

CHEMICALS
For Natural & Synthetic Rubber
"PICCO" Brand—Plasticizers; Coumarone Resins; Reclaiming Oils, Coal Tar Naphthas.
Pennsylvania Industrial Chem. Corp.
Clairton Penna.

CHEMICALS
A complete line of plasticizers, resins, substitutes, fillers, etc., for Synthetic, Natural and Reclaimed Rubber.
STANDARD CHEMICAL COMPANY
Akron Savings & Loan Bldg, Akron

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

COAL TAR CHEMICALS

Coumarone Resins	Tack Producers
Resinous Oils	Dispersing Oils
Reclaiming Oils	Softeners

Solvents

The Neville Company
Neville Island, Pittsburgh, Penna.

The Market Place

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Chemicals and Compounding Materials {continued}

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS

HEVEATEX CORPORATION
78 Goodyear Ave. Malrose, Mass.
Offices in New York, Akron, Chicago

FURNEX—FURNEX BEADS
The High Resilience
Semi-Reinforcing Black

BINNEY & SMITH CO.
41 East 42nd St. New York City

PARA-DORS—
overcome odors in rubber—effectively and at low cost.

GIVAUDAN-DELAWANNA, INC.
Industrial Aromatics Division
330 West 42nd St., New York, N. Y.

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures

MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.

Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.

The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

COMPOUNDING Materials

Vulcanizing Agents	Pigments
Accelerators	Clays
Antioxidants	Mineral Rubber
Plasticizers	Aromatics
Dispersions	Blacks

R. T. VANDERBILT CO.
230 Park Ave. New York City

IRON OXIDES
Asbestine—Barytes—Talc—
Soapstone

C. K. Williams & Co.
EASTON, PA.

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.

Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon Div.,
General Properties Co., Inc., Pampa, Texas

CUMAR —Paracoumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.

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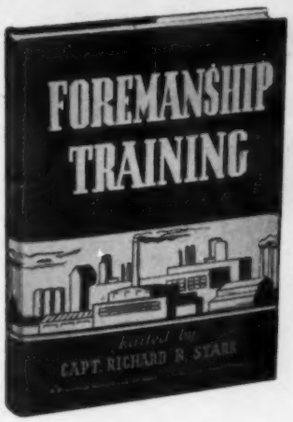

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